QualityPro

PIONEERS IN PEST MANAGEMENT

TESTING & TRAINING MANUAL

THE MARK OF EXCELLENCE IN PEST MANAGEMENT

NPMA

National Pest Management Association

Our Mission is Your Protection

Table of Contents

This is the training manual for the QualityPro technician and salesperson exam. This is one of the most fundament parts of QualityPro, and is an integral part of this program.

There are four chapters in this manual, each focusing on a different part of pest management. Chapter one is on customer relations, chapter two looks at pesticide application techniques and equipment, chapter three examines pesticides, and chapter four focuses on pests.

Each chapter is divided into three sections. The first part of each chapter is an outline format discussion of the topic to help you review for the exam. The second part is the actual test questions — these are the questions that will appear on the QualityPro exam, although the exam will only have a fraction of the number of these questions. The third part of each chapter is explanations about the answers, and why the other answers are incorrect.

Again, the actual exam will be these exact questions — the only trick is that you don't know which ones. Congratulations on working toward the QualityPro designation.

[version 10.15]

study guide

Chapter 1

CUSTOMER RELATIONS

1.1 APPROPRIATE BEHAVIOR

1) Two-thirds of customers who quit doing business with a company do so because of an attitude of indifference from a company employee. The employee "just doesn't seem to care."

2) A good attitude towards customers is easy to recognize:
   a) Respect a customer's property and time.
   b) Take time to explain what you're doing and why.
   c) Show a willingness to listen to comments and sympathize with complaints.
   d) Be willing to admit mistakes and apologize when one's been made.
   e) Do not "pass the buck" to company or coworkers (which just makes your company look bad).
   f) Follow through on commitments (schedules, phone calls, etc.).
   g) Act in an honest and ethical manner.

3) A bad attitude towards customers is also easy to recognize. For example:
   a) Arrive late; don't phone ahead; don't apologize.
   b) Show up just before dinner.
   c) Pound on the door or ring the bell repeatedly.
   d) Don't greet the customer, just grunt and begin work.
   e) If your shoes are dirty, don't bother to wipe them.
   f) Don't explain what you are going to do or give guidance.
   g) Argue with your customer.
   h) Don't address your customer by name; act like you don't remember it.
   i) Talk about what a crummy job you have and how awful your boss is; throw in a few curse words.
   j) Leave a door or a gate open on the way out.

4) Great customer service is the key to account retention.
   a) Do good, professional work.
   b) Be prepared to address unexpected pest problems by having adequate equipment and supplies available.
   c) Be on time. If you must be late, call with a new time.
   d) Respond right away to messages, problems, and questions.
   e) Remember your customer's name.
   f) Be respectful.
   g) Clean up after your work.
   h) Offer little extra services such as brushing down spider webs.

5) If you are careless about your appearance, customers will assume you are careless about your work.
   a) Attend to personal grooming and habits.
   b) Wear a clean fresh uniform or clothes each day.
   c) Shine or otherwise clean your shoes each day.
   d) Make sure your equipment is clean and well-maintained.

6) Do not smoke on your customer's property.
   a) In these health-conscious times, many people are offended when someone "lights up."
   b) Many customers regard a smoking break as a theft of the time they are paying for.
   c) Ashes on floors or carpets, or burns on furniture, can lose an account.
   d) It is unsafe or prohibited to smoke in many areas of commercial accounts.
   e) It can be dangerous to smoke while using pesticides.

7) Keep your conversations with customers professional.
   a) Do not complain about your work, your boss, or your personal life.
   b) Do not criticize other people (coworkers, competitors, politicians, etc.)
   c) Do not discuss politics, religion, sex, or other controversial subjects.
   d) Do not discuss the pest problems of other customers.

8) Do not criticize other companies.
   a) When you point fingers at the shortcomings of other companies it harms the image of the industry as a whole.
   b) If you disrespect other companies, they might just do the same to you some day.
   c) Most customers do not want to hear you say bad things about your competitors; it makes them uncomfortable, and it is unprofessional

9) Many food plants, hospitals, and other commercial accounts require everyone, including pest management contractors, to wear certain personal protective equipment (PPE) and to follow specific safety rules in certain areas.
   a) Be sure to comply with all customers' rules on PPE.
   b) Be sure to be informed about and follow all special safety rules for confined spaces, lockout/tagout, bloodborne pathogens, and fall protection.

10) Make a good **last** impression.
   a) Remove all equipment and trash from your work.
   b) Sweep up any dirt you may have tracked in.
   c) Reposition furniture and fixtures back to their original positions.
   d) For termite work, backfill all trenches, clean up drill dust, replace any removed sod, etc.

11) Never engage in any form of sexual harassment to customers, coworkers, or anyone else on the job.
   a) Sexual harassment includes unwelcome sexual advances, requests for sexual favors, verbal or physical conduct of a sexual nature.
   b) Verbal or physical conduct of a sexual nature includes touching, hugs, pinching, sexual jokes and banter, lewd gestures, sexual pictures, suggestive remarks.

1.2 DRIVING AND CUSTOMER RELATIONS

1) Do not block a customer's driveway with your vehicle.

2) Do not drive or park on the lawn.

3) Never operate a service vehicle when impaired in any way.
   a) Do not drive when your alertness or ability is impaired by fatigue or illness.
   b) Do not drive under the influence of alcohol.
   c) Do not drive under the influence of drugs ... illegal or legal ... which may impair driving.
   d) Do not consume an intoxicating beverage within four hours before operating a motor vehicle.
   e) Do not have **any** measured alcohol concentration when operating a motor vehicle.

4) Obey all traffic laws.
   a) Your driving reflects on the company.
   b) Do not drive too fast for road conditions.
   c) Keep a safe distance from the vehicle in front of you.
   d) Drive defensively and follow safe driving practices at all times.

5) Avoid distractions while driving.
   a) Things to avoid while driving include eating and drinking, reading or writing, grooming, and operating complex equipment.

6) Be safe when using cell phones.
   a) Use a hands-free device or pull off the road to make, receive, or complete a call.
   b) Be familiar with cell phone and Bluetooth® features such as voice activation, speed dial, and redial.
   c) Allow your voice mail to answer a call if traffic is heavy or driving conditions poor.
   d) Do not text while driving...EVER

7) Be especially careful when backing a vehicle; there may be a child or a pet behind your vehicle.
   a) Walk back and look at your path before backing.
   b) Avoid backing whenever you can.
   c) When you park, try to park so you will be able to pull forward when you leave.
   d) Back slowly.
   e) Use your backing camera if your vehicle is so equipped
   f) Back and turn towards the driver's side when possible.
   g) Use a helper if possible.

8) Avoid "road rage."
   a) Act responsibly, don't react in anger.
   b) Give the other driver and yourself a chance to cool down.
   c) Stay in control.
   d) Avoid eye contact, horn honking, light flashing, and gestures.

1.3 CUSTOMER COMMUNICATIONS

1) Good communications are necessary for pest management to work.
   a) Many customers do not understand the connection between pests and sanitation, clutter, cracks and holes in walls, etc.
   b) Homeowners, building maintenance and grounds personnel need to understand pestproofing and other steps they can take to keep pests from entering buildings.
   c) Residents and housekeeping staff can learn to find and give special attention to areas with sanitation problems.
   d) Food service workers need to understand the connection between inadequate sanitation and pests.

2) Good communications with customers by technicians and sales staff can cut callbacks and prevent contract cancellations.
   a) Customers often have unrealistic expectations; for example, they may expect immediate elimination of pests when it actually may take weeks.
   b) Customers may need to take action themselves in order for pest management to work (better trash management, pest proofing, fixing a leak, etc.)

3) Give customers information about pests at their site.
   a) What pests you found during your inspection.
   b) Where the pests live and breed.
   c) What conditions caused the problem.

4) Describe your service to your customer.
   a) What you're going to do and why.
   b) What to expect from the service; what not to expect.
   c) The cost of the service.
   d) What the warranty covers.
   e) Preparations that must be made by the customer.
   f) Whether or not the customer can expect some odor.
   g) When the customer can expect to see results.
   h) How long control can be expected to last.
   i) Precautions the customer must take.

5) Describe any follow-up actions.
   a) Schedule for any additional service or monitoring.
   b) Steps the customer should take to help prevent the problem in the future.

6) Communication can take place both by talking and through the written word.
   a) Informational handouts.
   b) Service reports.
   c) Sanitation reports.
   d) IPM logbook.
   e) Conversations between technicians and customers.
   f) Customer communications may also include notification of pesticide applications and posting of treated areas.

7) All paperwork and electronic data entry should be legible (if handwritten), accurate, understandable, and complete.
   a) Customers need to be able to read and comprehend your reports, logs, and recommendations.
   b) Sign your name legibly and record the date.
   c) Make sure that all information is accurate so that you or the company would be able to use the paperwork for defense a year from now in a lawsuit or disciplinary hearing.
   d) Avoid leaving blank spaces on preprinted forms or using ditto marks.

8) Never make up an answer to a customer's question.
   a) If you don't know the answer, say so.
   b) Offer to get the information and get back to the customer. Then make sure you do so.
   c) Write down the question to be sure you get it right.
   d) Don't try to answer medical questions. Tell your customer that you are not a medical expert and that a physician should answer these types of questions.

9) Don't put off bad news.
   a) Otherwise, when a customer finds out, the customer will likely never trust you or your company again.
   b) If you are going to be late or are unable to make a scheduled appointment, call your customer as soon as possible.
   c) If you damage your customer's property, say so. Don't try to hide it.
   d) If your treatment failed, say so and describe the additional steps you plan to take.

10) Studies show that customers tell at least twice as many people about their bad experiences with a company than about their good ones.

11) The single most important rule about handling complaints is this: Listen carefully to your customer's complaint.
   a) Don't tune out or stop listening just because the comments are making you uncomfortable, or you think you know what the complaint is about.
   b) Do not interrupt.
   c) Watch your body language: Make eye contact, lean forward, look interested, nod.
   d) Do not argue. Respond if your customer asks a question, but remember that your main purpose is to listen so you can understand the complaint.
   e) Take notes. It demonstrates your willingness to see the problem resolved, and it documents the important details.

12) Whenever there is a complaint or a conflict with a customer, be courteous, understanding, and diplomatic.
   a) Avoid confrontation.
   b) Never embarrass your customer even if you are right and he is wrong.
   c) Do not let a complaining customer draw you into an argument.
   d) Let the customer know by your words and actions that you want to resolve the problem.

13) Every complaint requires a response.
   a) Never do nothing.
   b) Resolve the problem on the spot if you can.
   c) Offer alternative solutions if you can.
   d) Do not make promises you cannot fulfill.
   e) If you can not solve the problem, or if you do not agree with your customer's position, let your customer know that you will refer the issue to your supervisor.
   f) Provide your supervisor with written details of the complaint (who, what, where, when, and why) as soon as possible.

14) Resolving customer complaints can improve your work and better your company's image.
   a) It is far better to get a complaint than to have a customer simply cancel service.
   b) A complaint gives you the chance to correct a problem or provide the level of service a customer was expecting in the first place.
   c) If you resolve a complaint, you will typically create more loyalty than if a problem had never occurred.
   d) Complaints help you identify areas of your service that need improvement so you can avoid problems and cancellations at other accounts.

1.4 TELEPHONE ETIQUETTE

1) Market research shows that 85 percent of customers rank telephone courtesy high in their decision on who they do business with.

2) Fifty percent of customers will refuse to do business with a company if they feel they received poor customer service over the phone.

3) Your company's reputation is on the line with every incoming call.
   a) Good telephone etiquette can create good will and set the tone for strong customer relationships.
   b) Your personality comes over a telephone line as clearly as your voice.
   c) Smile and your voice smiles.
   d) Your customer overlays your personality on to the company itself; to your customer, YOU are the company.

4) Answer the phone between the second and fifth ring.
   a) Longer, and callers begin to get antsy, and begin to wonder about the staffing level and professionalism of the company.
   b) Answering the phone too soon also makes callers uneasy. Often, they haven't gotten themselves quite ready for a conversation until the second ring.

5) There are 3 things to include when answering the telephone:
   a) greeting
   b) company name
   c) your name

6) Take notes and listen attentively.
   a) If the caller doesn't tell you his or her name, ask for it right away and write it down.
   b) Avoid using first names; some people are greatly offended by such informality, while very few mind being addressed formally on initial contact.

7) Be courteous when putting callers on hold.
   a) Always ask them first, since they may prefer to call back.
   b) Return to callers on hold every 20-30 seconds so they know they haven't been forgotten, otherwise you will lose them in less than a minute, on average.

8) When transferring a call, give a name whenever possible, not just a department.
   a) If you have transferred a call, check to make sure that the call actually transferred, and that the caller is not left hanging on a dead line.

9) Always return calls.
   a) A call not returned is a promise broken, and a quick way to lose a customer.

10) When scheduling a callback for yourself or another employee in your company, get sufficient information to make the call productive.
   a) Determine who is the best employee to return the call.
   b) Fix a mutually convenient time.
   c) Clearly write out the following information:
      i) name of caller; ask for proper spelling
      ii) phone number
      iii) time of the call and time for returning the call
      iv) property or service address
      v) a clear message and your name

11) Be courteous and helpful, even when your caller is abrupt or rude.

1.5 SALES TECHNIQUES

1) A hot prospect for a sale is one who is highly motivated to do business with you.
   a) Selling time is best spent on hot prospects.
   b) You can develop hot prospects.
   c) But you will still have to call on other prospects, some not very hot at all.

2) A sales prospect can be hot or cold depending on certain criteria.
   a) How serious the pest control problem is (cold - minor inconvenience; hot - facing financial loss or fear of a pest).
   b) The customer's impression of you (cold - never heard of you or heard bad things; hot - recommended by a friend).
   c) The prospect's present pest management service (cold - satisfied with current contractor; hot - unhappy with service).
   d) Timing of the sales call (cold - cannot commit right now because of money problems, planning to relocate, etc.; hot - deciding right now (serious damage, health department involved, potential lawsuit).

3) Hot prospects can be developed.
   a) Seek out referrals.
   b) Call on existing customers for add-ons.
   c) Establish a follow-up system for future sales.
   d) Make a cold call and turn the cold contact into a hot prospect through good salesmanship.

4) A referral is a hot prospect that you get from a person that knows both you and the prospect.
   a) One type of referral is when a customer gives you the name; for example, "Why don't you go see Bill next door? He told me he was having trouble with yellowjackets."
   b) Another type of referral is when your customer gives your name to a neighbor or friend. "Hello, I'm Bill. I have a problem with yellowjackets and my neighbor was happy with your work and suggested I call you."

5) You can increase your referrals by your own actions.
   a) After a service call, ask your customer if he knows anyone that might need your services.
   b) Leave a few calling cards with each customer and ask the customer to pass them on to anyone that might need your service.
   c) Survey your current customers in person or by telephone and ask them if they are satisfied with their service. If so, ask for a referral.

6) You can also use your existing customers as leads to new business.
   a) Managers and workers at commercial accounts may be interested in your residential service at their homes.
   b) Your residential customers may own businesses looking for commercial pest management.
   c) Contact former and current customers when you begin offering a new service or when a seasonal pest becomes active.

7) Institute a follow-up system (a "tickler file") for cold prospects who may become hot at some future time.
   a) A current customer with two years to run on a termite warranty is a cold prospect now but will be a hot prospect a month or two before contract expiration.
   b) New developments whose termite pretreat warranties are due to expire.
   c) Any prospect who turned you down because of timing ("no money right now," "we are going out of the country for a month," etc.)
   d) Seasonal repeaters - those customers who always contract for one-time seasonal service on certain pests.

8) A cold call is personal contact with a prospect you do not know, that you do not have any connection with, and whose needs you do not know.

9) Certain techniques can help you get the most from cold calls.
   a) Pick a single category (small commercial accounts, residential, hotels) or a limited geographic area based on your company's marketing plan.
   b) Concentrate your calls geographically to maximize your effort and minimize your time.
   c) Use existing routes and fill in holes where new accounts can be handled most profitably.
   d) Make every call a planned call: know what you are going to say before you begin.

10) Very few cold calls will result in a direct sale, but a certain percentage can raise a prospect from cold to hot … or at least warm.

11) Once a prospect becomes warmer, it is time to make your basic sales presentation, which consists of five elements.
   a) The opening.
   b) Inspection and questions.
   c) Recommendation.
   d) Handling questions and objections.
   e) Close and follow-up.

12) The opening should explain your presence and reduce the prospect's apprehension.
   a) A low-key approach is best.
      i) Be nonthreatening.
      ii) Smile and look into your prospect's eyes.
      iii) DO not jump immediately into the sell.
   b) Introduce yourself and state the reason for your call.
   c) Include any connection with the prospect — a referral, or the fact that you were working on the block, etc.
   d) Make it short and move quickly on to the next element, which directly involves the prospect.

13) Even if you feel you know what the problem is, the inspection/question element is necessary.
   a) The prospect will not have confidence in you unless you take the time to obtain information about the structure and the pests at the site.
   b) Good inspection technique and proper assessment of infestations is not only important to designing a management plan, but is essential for your sales success.

14) There are three main reasons for asking questions of your sales prospect.
   a) Some of the answers help you identify the nature and scope of the infestation.
   b) Some of the answers help you determine information about the prospect's buying decision (who decides, when will the decision be made, etc.)
   c) The process keeps the prospect involved in the sales presentation.

15) Your recommendation is your proposal to provide service.
   a) Describe the extent of the problem.
   b) Present your solution.
   c) Clearly state the benefits **to the prospect** of your company's service.
   d) Provide "proof" of these benefits (how the benefits come about, how you have solved similar problems at similar locations).
   e) If you have a unique selling position (what is different about the service you are offering), present it clearly.

16) Handling questions and objections is a normal part of any sales presentation.
    a) If the prospect is not asking questions, you are probably not getting through.
    b) Welcome questions and objections as an indication of the prospects interest and involvement in your presentation.
    c) Questions and objections are also a guide to what your prospect is thinking and so let you fine-tune your sales approach.

17) Listen carefully to questions and objections.
    a) Jot down notes of important points (prospects appreciate that).
    b) Do not interrupt, even if you know what the prospect is going to say.
    c) Follow the 80/20 rule of sales: listen 80% of the time, talk 20% of the time.
    d) Watch the prospect's facial expressions and body language.
    e) Ask questions of the prospect to pin down the specific objection.

18) Answer questions and respond to the objections sympathetically.
    a) Agree with legitimate concerns.
    b) Present facts that refute objections.
    c) Offset concerns with benefits.
    d) For some objections, the best response is to give the names of satisfied customers.

19) When selling IPM service, be sure to emphasize IPM's benefits during sales presentations:
    a) Less use of pesticides and exposure to pesticides
    b) Reduced liability and risk of lawsuit
    c) Improved long-term control of pests
    d) Preventive rather than reactive service
    e) Detailed record-keeping that documents success and identifies and tracks problems
    f) Improved building maintenance
    g) Improved sanitation and housekeeping
    h) Easy to defend, support from researchers, regulators, educators, and politicians
    i) The "latest, most advanced technology"

20) Closing is the logical end to the sales process.
    a) No sales call is complete without an attempt to get a commitment from the prospect.
    b) The best time to try a close is when the prospect gives a buying signal.
    c) Common buying signals include the prospect's agreement with a main point or series of points, and the prospect's expression of satisfaction with the answer you have given to an objection.

21) A trial close is a question to the prospect that will provide a buying commitment if the response is favorable, but that won't close the door on the sale if the answer is unfavorable.
    a) An example of a trial close is, "When would it be convenient for us to do this?"
    b) Use a trial close as early as you can.
    c) If the prospect responds negatively, continue with the presentation.
    d) If the prospect responds favorably, wrap up the sale with the final close.

22) When you feel the time is right, proceed to the final close. Some examples include:
    a) Present a written proposal/agreement ready for signature.
    b) Suggest the service and give the prospect a range of options and pricing.
    c) Assume you have the business and simply proceed with the order (only if the call is going well).
    d) Ask for the order directly.

23) If the close fails, but the order is left hanging rather than refused outright ("Maybe," or "I'll think it over."), follow-up action is necessary.
    a) Ask questions to bring out an objection or question that you haven't adequately addressed.
    b) Leave yourself an opportunity to call back or revisit later.

24) Watch out for these sins of selling that can lose sales and damage reputation.
    a) Not knowing the details of the service to be provided.
    b) Promising an answer and then not following through.
    c) Presuming a personal relationship with a prospect that doesn't exist.
    d) Being late for appointments.
    e) Promising what cannot be delivered.
    f) Not listening.
    g) Not understanding a prospect's business operations and concerns.

1.6 SALES TACTICS FOR TECHNICIANS

1) Technicians are in a unique position to find new pest control business and have many selling opportunities.
   a) Technicians work where the action is.
   b) Technicians know what pests are hot.
   c) Technicians move around town.
   d) Technicians know when a building's being renovated, and when the neighborhood gets cable TV.
   e) Technicians know if a customer's child brings home a stray puppy, or that the neighbors are talking about rats.

2) Even if technicians don't sell the account themselves ... and many companies have a policy that only salesmen sell accounts ... they can provide hot leads for someone else.

3) Technician sales opportunities come in two categories:
   a) "Add-ons" to existing customers.
   b) New service to neighbors, either residential or commercial.

4) Technicians should get in the habit of inspecting each account for potential pest problems during regular service.
   a) Inspect the account as though it were the first visit; pretend you are seeing it for the first time.
   b) Look not only for the pests you're supposed to control during regular service, but also for pests and conditions not covered under the regular pest control contract.

5) In residential or hotel accounts, do a quick check for bed bugs.
   a) A positive finding can result in multiple sales for bed bug service, as well as providing a major benefit for residents and management.
   b) If residents are present, ask them if they have concerns about bed bugs in their building and if they want you to check for them.
   b) Check around beds, cribs, couches, and recliners.
   c) Quickly pull back the sheets a few feet looking for spotting, shed skins, live bed bugs, eggs on bedding, mattress, or box spring.
   d) Look for blood spots on walls, baseboards, and furniture close to sleeping areas.

6) When work is a little slow, check for wood-destroying insects.
   a) Go down into the basement or peek in the crawlspace looking for termite tubes or dead swarmer termites.
   b) Inspect the floor joists for fresh powderpost beetle holes, particularly if the building has a moisture problem.
   c) Inspect the attic for powderpost beetle or old house borer damage.
   d) Look for dump piles from carpenter ant nests.
   e) Go outside and check along the outside foundation for termite tubes.

7) If you find a problem, show it to your customer. Remember, you're doing him a favor and potentially getting new business.
   a) Either sell the job, if you know how, or have a salesman contact the customer later.

8) If a residential client acquires a new dog or cat, describe your flea control services.
   a) Explain how fleas can become a serious problem, particularly in the summer and fall.
   b) Discuss the flea's life cycle. Remember that most homeowners do not know where fleas come from, the difference between adult fleas on the pet and larval fleas in the rug, or how easy it is for pets to pick up new fleas from outside.
   c) Explain about preventative treatments and growth regulators ... or whatever methods your company uses for flea control ... and how you can ensure your customer a flea-free summer.

9) Check the structure for moisture problems.
   a) Keep an eye out for water pooling against the foundation after a rain, wet crawlspaces, water stains, fungus, and other signs of moisture problems in your accounts.
   b) If you find a problem, explain to your customer how high moisture levels can lead to wood rot, termites, and other pest problems. Most people do not understand the connection between moisture and pests.
   c) Discuss any moisture control services your company offers, such as installing crawlspace vents or plastic sheeting.

10) Technicians working in food plants, warehouses, or apartment buildings need to check the building's roof once in awhile for roosting birds or bats.
    a) Even if you don't see the pests themselves, look for accumulations of droppings and bird nest material around damaged soffits, unscreened vents, signs, A/C units, walkways, etc.
    b) Ask maintenance workers if they have had a problem with either birds or bats.
    c) If you identify pest bird problems, discuss your company's bird management services.

11) Get new customers from your old customers' neighbors.

12) Many pests infest an entire area, not just one building.
    a) If your customer has clover mites, crickets, millipedes, elm leaf beetles, or other "occasional" pests, it's likely that your customer's neighbors have these same pests too.
    b) Ask around. You may be able to sell a number of perimeter treatments in the area.

13) Consider using the "clover leaf" system.
    a) When you visit one account you also call next door (on each side) and across the street.
    b) One visit becomes four.

14) Renovations of large buildings, or excavation for subways, tunnels, and other underground projects often mean major rat problems in the area, and good opportunities for new business.

15) Most building managers do not realize that they lose termite protection when the soil is excavated next to the foundation.
    a) Foundation renovations, repairs, waterproofing, and other excavations at the foundation provide a good opportunity for extra termite work.
    b) Even a small disturbance like the installation of underground cable TV lines can destroy termite protection and require spot treatment.

16) Keep an eye open for yellowjackets, wasps, and bees nesting in or near buildings of potential customers.
    a) If you find a nest, show the residents or site manager. In most cases they will want the nest removed quickly.
    b) Even if they have their own pest control service, they may opt for you to do the job then and there.

study questions

Chapter 1

CUSTOMER RELATIONS

1.1 APPROPRIATE BEHAVIOR

1) Which one of these is not an example of a good attitude towards customers?
   a) act in an honest and ethical manner
   b) ask your customer to direct all complaints to a supervisor
   c) respect a customer's property and time.

2) About 2/3 of all customers who stop doing business with a company made that decision because the employee "just didn't seem to care."
   a) true
   b) false

3) It's okay to smoke on a job site as long as you are not using pesticides and there are not any "NO SMOKING" signs posted.
   a) true
   b) false

4) Which one of these topics is it okay to discuss with your customer?
   a) politics
   b) other pest control companies
   c) pest problems

5) If a construction customer asks you to wear a hard hat on site, you should first:
   a) wear a hard hat
   b) explain that you are doing pest control
   c) ask for an exemption

6) Which actions would be considered inappropriate around customers.
   a) reporting a mistake to your customer and apologizing for it
   b) listening to your customer complain about your coworker's service last month
   c) avoiding conversation with your customer and doing your work quickly

7) A customer complains that the technician that provided service at the previous visit was sloppy and rushed through the job. You should:
   a) listen to the customer's comments and sympathize with the complaints
   b) explain that the technician isn't very good and that he doesn't represent the high level of quality of the rest of the company's technicians
   c) don't discuss the problem but refer the customer to your supervisor

8) A business customer complains about the control failures of the pest control contractor that services his home. You should:
   a) explain that the other pest control company is known for poor service and give other examples of poor service that you know of from that company
   b) stop the conversation and tell the customer that you can't talk about other companies
   c) listen and sympathize with you customer and offer to have yourself or someone else check out the problem if he so wishes

9) Sexual harassment includes unwelcome sexual advances and requests for sexual favors but not "dirty" jokes or sexual "banter."
   a) true
   b) false

10) What is the primary reason that good personal grooming, clean clothes, shined shoes, and clean equipment are important factors in customer relation?
   a) customers want workers at their property to be attractive
   b) if you care about your appearance, customers will assume you care about your work
   c) you want to look better than the competition

11) Why should you be prepared with equipment and supplies for rodents, stinging insects and other pests in your vehicle when you know you are servicing an account strictly for ants and cockroaches?
   a) so you will be prepared for unexpected pest problems and not have to come back an another service call
   b) because you have more inventory control when you have your supplies in your vehicle
   c) because it is typically company policy

12) If you are running an hour late for your next scheduled service at an important account you should:
   a) explain the situation to your current customer, skip service and apologize, and move on to the important account
   b) call the next account, explain that you will be late, apologize, and give a new estimated time of arrival
   c) do nothing—an hour is not a significant delay

13) Why is it important to remove all equipment, clean up any dirt or debris, reposition furniture and fixtures, and leave an account as clean as it was when you arrived?
   a) to prevent a potential lawsuit
   b) because regulations require you to remove all items that you may have brought in to service an account and to return everything to its original condition
   c) in order to make a good last impression on your customer

1.2 DRIVING AND CUSTOMER RELATIONS

1) Which one if these is a true statement about driving a vehicle?
   a) don't drive within one hour of drinking an alcoholic beverage
   b) avoid backing whenever you can
   c) make immediate eye contact with any driver exhibiting "road rage"

2) When using a cell phone while driving, you should:
   a) avoid sending calls to voice mail.
   b) slow down.
   c) use hands-free device or pull off of the road.

3) Where is the best place to park for residential service?
   a) driveway
   b) lawn
   c) street

4) When backing a vehicle, you should:
   a) walk back and look at your path before backing
   b) back and turn towards the passenger's side
   c) once you know you are clear, back quickly

5) You should avoid distractions when driving. Which task is not considered to be a distraction?
   a) eating and drinking
   b) checking your mirrors for traffic
   c) reading a map

6) The statement "do not drive under the influence of drugs" applies to both legal and illegal drugs which may impair driving ability.
   a) true
   b) false

1.3 CUSTOMER COMMUNICATIONS

1) Which one of these is not information that you should communicate to your customer?
   a) what pests you found
   b) what you're going to do and why
   c) what they did wrong to cause the pest problem

2) Which one of the following statements is false?
   a) customers often expect immediate elimination of pests
   b) customers often do not understand the connection between pests and sanitation
   c) customers are not capable of doing pestproofing themselves

3) You should explain to customers what not to expect from pest control service.
   a) true
   b) false

4) After you've completed the service, you should explain to the customer the cost of the service and what the warranty covers.
   a) true
   b) false

5) Which one of these reports is not a way to communicate with your customer?
   a) incident report
   b) service report
   c) sanitation report

6) If a customer asks you a question concerning a medical pest problem, such as the possible long-term health effects of Lyme disease on their child, you should:
   a) give the best answer that you can
   b) tell your customer you'll ask your supervisor
   c) tell your customer to contact a physician

7) When listening to a customer's complaint, you should:
   a) avoid eye contact to show respect for the customer
   b) take notes to document important details
   c) debate the problem to show your interest

8) The best way to respond to a customer complaint is to:
   a) resolve the complaint on the spot
   b) refer the complaint to your supervisor
   c) have an answer for the customer at the next visit

9) Good communications with your customer:
   a) can cut callbacks and prevent contract cancellations
   b) should inform customers of their responsibilities for pestproofing
   c) should describe how long before the customer should expect to see results
   d) all of the above

10) During your service of a residence where no one was home, you knocked over a vase and broke it. You should:
   a) clean up the mess and leave a note about the accident
   b) clean up the mess and report the accident to you supervisor at the end of your workday
   c) leave everything just as it is

11) The single most important rule about handling complaints is:
   a) don't admit fault until you check with your supervisor
   b) listen carefully to the complaint
   c) when your customer makes a false statement, interrupt and correct it immediately

12) Sometimes, the best action you can take on a complaint is to do nothing.
   a) true
   b) false

13) Which statement is true about customer complaints?
   a) complaints almost always lead to cancelled service
   b) immediately refer complaints to a supervisor
   c) resolving complaints can better your company's image

14) Which one of the following statements about written communications with customers is false?
   a) customers need to be able to read written reports, logs, or recommendations.
   b) sign your name legibly and record the date.
   c) leave blank spaces on preprinted forms where the information is not applicable.

1.4 TELEPHONE ETIQUETTE

1) Market research shows that _____ percent of customers rank telephone courtesy high in their decision on who they do business with.
   a) 15
   b) 50
   c) 85

2) Which statement is true about telephone etiquette?
   a) fifty percent of customers will refuse to do business with a company if they feel they received poor service on the phone
   b) your company's reputation is on the line with each incoming call
   c) both a) and b) are true

3) You should always try to answer the phone on the first ring.
   a) true
   b) false

4) Which one of these is something not to include in your phone greeting?
   a) your name
   b) the time
   c) your company

5) Which one of these statements is true?
   a) avoid using a caller's first name
   b) if a caller doesn't provide a name, use "sir" or ma'am"
   c) always wait 24 hours before returning a call

6) When scheduling a callback to a customer, you should:
   a) keep trying until you get the customer on the phone
   b) always have the office manager make the call
   c) write out the pertinent information for the person returning the call

7) When putting a caller on hold, you should:
   a) ask for their permission
   b) check back after 2 minutes on hold
   c) ask them to call back after 5 minutes on hold

8) The best way to handle a rude customer is to ask them to call back when they have calmed down.
   a) true
   b) false

1.5 SALES TECHNIQUES

1) A "hot prospect" for a sale is someone who is highly motivated to do business with you.
   a) true
   b) false
2) Which one of these describes a "hot prospect?"
   a) person recommended by a friend
   b) person happy with current contractor
   c) person planning to move

3) Which one of these describes a "cold prospect?"
   a) person who is afraid of pests
   b) person unhappy with current contractor
   c) person having money problems

4) A good way to increase referrals is by:
   a) leaving business cards with customers and asking them to pass them on
   b) asking customers who have cancelled your service to recommend others
   c) going door to door in a neighborhood

5) Which one of these is not an example of a cold prospect that could become a hot prospect in the future?
   a) customer whose termite warranty will expire in a year
   b) person who "doesn't have any money right now."
   c) person who doesn't mind living with pests

6) A "cold call" is personal contact with a person:
   a) that has been referred to you by a customer
   b) that has not been referred
   c) that has contacted you for service

7) When making cold calls, you should:
   a) make random calls in different areas
   b) make calls in a single geographic area
   c) avoid making calls in existing routes

8) Very few cold calls will result in a sale.
   a) true
   b) false

9) A basic sales presentation consists of the opening, inspection and questions, recommendation, _____, and the close and follow-up.
   a) application
   b) argument
   c) handling questions and objections

10) Which one of the following statements is true about the "opening" part of a sales presentation?
   a) it should be the longest part of your presentation
   b) it should introduce you and the reason for your call
   c) it should present your solution for the problem

11) Which one of the following is not a reason to ask questions of your sales prospect?
   a) to get information about the prospect's buying decisions
   b) to involve the prospect
   c) to keep the prospect off guard until you close

12) The recommendations part of your sales presentation should:
   a) describe the extent of the problem
   b) attempt to get a final close from the prospect
   c) explain how you found the prospect

13) During the questions and objections part of your sales presentation, you should:
   a) debate with the prospect to show that his questions are not legitimate concerns
   b) take notes
   c) present a written agreement for signature

14) Questions and objections during your sales presentation are a signal that your presentation is not going well.
   a) true
   b) false

15) Which one of the following statements is false?
   a) questions and objections from your prospect let you fine tune your sales approach.
   b) the prospect will have more confidence in you if you ask questions.
   c) never give the names of other customers during your sales presentation

16) You can present a "trial close" early in your sales presentation.
   a) true
   b) false

17) Which one of these is not an example of a final close?
   a) presenting a proposal
   b) conducting an inspection
   c) offering a price

1.6 SALES TACTICS FOR TECHNICIANS

1) Technicians have good selling opportunities because:
   a) they work where the action is
   b) they know what pests are "hot"
   c) they are familiar with their service area
   d) all of the above

2) To find new sales opportunities, a technician should:
   a) inspect each existing account as though it were the first time on the site
   b) make "cold calls" to companies in the yellow pages
   c) check out a salesman's "hot lead" list
   d) all of the above

3) If a company has a policy that only salesmen can sell pest management service, technicians can still help with sales by:
   a) providing hot leads
   b) making preliminary "cold calls" to new geographic areas
   c) doing nothing—all sales responsibility should be in the hands of the sales force

4) To find additional sales opportunities in existing accounts, a technician could:
   a) inspect the account occasionally for wood-destroying pests
   b) check the structure for moisture problems
   c) describe flea control services when a customer gets a new dog or cat
   d) all of the above

5) If you find a new pest problem not covered by your current service agreement you should:
   a) inform your customer of the problem
   b) wait until asked about the problem by your customer
   c) take care of the problem first

6) After you have shown an existing customer a new pest problem not covered by the current service agreement, you should:
   a) provide a phone number for a company salesman
   b) sell the job, if you know how, or have a salesman make contact later
   c) simply take care of the problem under the current service agreement

7) In residential or hotel accounts, a positive finding after a quick check for bed bugs can result in multiple sales for bed bug service, and can provide a major benefit for residents and management.
   a) True
   b) False

8) What is the "clover leaf" system for pest control sales?
   a) when you service one account you also make a sales call next door and across the street
   b) each week, you take a different exit off of a highway clover leaf and make sales calls
   c) trusting sales calls to "luck"

9) Why should you check with your customer's neighbors when occasional perimeter pests first appear at your account?
   a) the pest problem at you account may be caused by a neighbor
   b) they may be aware of the source of the pests
   c) if your customer has a seasonal perimeter pest problem, it's likely that the neighbors do too, so it's an opportunity for a sale

10) Why is a major building renovation an opportunity for new business for your company?
    a) building renovations often flush out rats and mice
    b) the new occupants may not be your customers
    c) it's an opportunity to get "in on the ground floor" of a new development

11) Why should you be on the lookout for foundation renovations and repairs in your service area?
    a) it signals new residents or businesses in the building and so potential new business
    b) buildings lose termite protection and require spot treatment when the soil is excavated next to the foundation
    c) it indicates the area may be susceptible to moisture problems

12) Why should you always be on the lookout for stinging insect activity?
    a) by showing a stinging insect nest to an resident or business manager, you can often make an immediate sale for nest elimination
    b) areas with stinging insect activity this year will be good sales areas for pest control service next year
    c) so you can stay away from the area and so avoid being blamed for the stinging insect risk

study questions

Chapter 1

CUSTOMER RELATIONS

1.1 APPROPRIATE BEHAVIOR

1. Answer b) is correct. Failing to respond directly to customer complaints is not an example of a good attitude towards customers. You should show a willingness to listen to comments and sympathize with complaints. Then, if necessary, direct the complaint to a supervisor.

   Answer a) is incorrect because acting in an honest and ethical manner is an example of a good attitude. Answer c) is incorrect because respecting a customer's belongings and time are example of a good attitude.

2. Answer a) is correct. Two-thirds of customers quit doing business with a company because of an attitude of indifference from a company employee.

3. Answer b) is correct. This statement is false because many people are offended by smoking, you may damage a customer's property, and smoking is prohibited in many commercial accounts.

4. Answer c) is correct. You should discuss pest problems with your customer. That's your job. Take time to explain the problem, what you're doing, and why. Answer any questions as best you can. Get answers if you don't know them.

   Answer a) is incorrect because you should never discuss controversial subjects such as politics, religion, or sex with a customer. Answer b) is incorrect because when you point fingers at others in the industry, you harm the entire industry and might make customers feel uncomfortable.

5. Answer a) is correct. Wear a hard hat. You should always comply with your customer's rules regarding personal protective equipment and any other specific on-site rules.

   Answer b) is incorrect because you are on your customer's property and are obligated to follow the same rules as other employees and contractors. Answer c) is incorrect because it is your customer's job to see that you are protected while on his property.

6. Answer c) is correct. It is inappropriate to avoid conversation with your customer. You should show a willingness to listen to comments and sympathize with complaints.

   Answer a) is incorrect because it is appropriate that you be willing to admit mistakes and apologize when one has been made. Answer b) is incorrect because it is appropriate that you listen to your customer's comments. Furthermore, a complaint is an opportunity to improve service.

7. Answer a) is correct. Listening to your customer's comments and sympathizing with his complaints (while not necessarily admitting that the complaint is justified) is consistent with a good technician attitude and good customer relations. Not listening is insulting and makes customers angry.

   Answer b) is incorrect because it is unprofessional and makes your company look bad. Answer c) is incorrect because, while you may have to refer this complaint to a supervisor, your should still have the courtesy to listen to your customer's comments and complaints.

8. Answer c) is correct. Listening and sympathizing is consistent with a good technician attitude and good customer relations, and offering to check out the problem will be appreciated and may result in a sale.

   Answer a) is incorrect because criticizing competitors is unprofessional and harms the image of the entire industry. Answer b) is incorrect because the customer will resent being cut off — always listen sympathetically.

9. Answer b) is correct. The legal definition of sexual harassment also includes sexual "dirty jokes" and sexual banter, as well as lewd gestures, suggestive remarks, sexual pictures and a long list of other sexual conduct that makes people uncomfortable or threatened.

10. Answer b) is correct. Customers generally assume that a sloppy technician does sloppy work and *vice versa*.

    Answer a) is incorrect because, while it may be true in some instances, personal attractiveness is not the primary reason that good grooming and neatness reflect good customer relations. Answer c) is incorrect because, while it isn't a bad thing to look better than the competition, pest management isn't a beauty contest, and the primary reason is answer a).

11. Answer a) is correct. You should always be prepared to address unexpected pest problems immediately by having adequate equipment and supplies available. Customers do not want to wait for hours or days for their pest problem to be addressed.

    Answer b) is incorrect because it has nothing to do with customer service. Answer c) is incorrect because, while it may, in fact, be company policy, the reason is so that you can provide timely customer service.

12. Answer b is correct. Customers want advanced notice that there will be a delay so that they can make arrangements for the change.

    Answer a) is incorrect because you would be short-changing your current customer and making him feel second rate, which would certainly result in a customer relations problem. Answer c) is incorrect because an hour is a significant delay to most customers, and it is common courtesy to call in and warn of it.

13. Answer c) is correct. A sloppy close-out procedure can make a good job look bad to a customer. That last impression is just as important as a first impression, maybe more so.

    Answer a) is incorrect because a lawsuit isn't a likely outcome of a clean-up issue, but it might result in a contract cancellation or insurance claim. Answer b) is incorrect because these kind of issues are generally not addressed in regulations.

1.2 DRIVING AND CUSTOMER RELATIONS

1. Answer b) is correct. This is a true statement because you should avoid backing a vehicle if you don't have to. When you park, try to park so you will be able to pull forward when you leave.

    Answer a) is not true because you should not have an alcoholic beverage within four hours of operating a vehicle, and you should never have any measurable alcohol in your system while driving. Answer c) is not true because in a situation involving road rage, you should avoid eye contact, horn honking, flashing lights, or gestures. Stay in control; give yourself and the other driver a chance to cool down.

2. Answer c) is correct. To make or answer a cell phone call, you should either pull off of the road or use a hands-free device.

    Answer a) is incorrect because you should allow your voice mail to answer a call if traffic is heavy or driving conditions are poor. Answer b) is incorrect because slowing down has little effect on your degree of distraction from the call.

3. Answer c) is correct. When possible, you should park in the street as close to the account as practical.

    Answer a) is incorrect because parking in the driveway typically restricts your customer's use of it. If you need to use the driveway, you should clear it with your customer first. Answer b) is incorrect because parking on a lawn will damage the grass and usually be resented by your customer.

4. Answer a) is correct. Make sure that there are no children, pets, bicycles, or other items behind your vehicle before backing.

    Answer b) is incorrect, because, for the best visibility, you should back and turn towards the **driver's** side when it is necessary to back up. Answer c) is incorrect because you should always back slowly so that dogs and people can avoid being hit if they happen to walk into your path.

5. Answer b) is correct. Checking mirrors for traffic is good driving practice, not a distraction.

    Answer a) is incorrect because eating and drinking is considered a potential distraction and is sometimes the cause of accidents. Answer c) is incorrect because reading a map and driving safely is very difficult and has often lead to accidents.

6. Answer a) is true. All kinds of drugs can affect driving ability, whether those drugs are legal or illegal, and whether they are prescription drugs or over-the-counter drugs. Over-the-counter antihistamines, for example, can make you drowsy, uncoordinated, and easy to distract.

1.3 CUSTOMER COMMUNICATIONS

1. Answer c) is correct. You should not blame the customer for the pest problem. Instead diplomatically explain what caused the problem and explain steps that the customer can take to help correct it and keep it from happening again.

   Answer a) is incorrect because you should explain to your customer what pests you found. Answer b) is incorrect because you should explain to your customer the steps you're going to take and why they are necessary.

2. Answer c) is correct. This statement is false because customers are very capable of taking steps such as caulking and screening to keep pests from entering buildings. Part of your job is to tell them what can be done to keep pests out.

   Answer a) is true because customers often have unrealistic expectations of the amount of time it will take to solve their pest problem. Answer b) is true because customers often don't understand that garbage, grease, clutter, etc. contribute to pest problems.

3. Answer a) is correct. You should explain to customers what to expect from pest control service, as well as what not to expect. Customers often have a very different concept of what the service will accomplish.

4. Answer b) is correct. This statement is false because you should always explain the cost and the warranty coverage **before** service.

5. Answer a) is correct. An incident report is not a way to communicate with a customer because it is an internal company document.

   Answer b) is incorrect because a service report is perhaps the most important communication with your customer and should be supplied to the customer after every service visit. Answer c) is incorrect because a sanitation report provides your customer with information on internal problems that need to be corrected as part of the pest management program.

6. Answer c) is correct. Don't try to answer medical questions. Explain that you are not a medical expert and that a physician should answer these types of questions.

   Answer a) is incorrect because if you don't know the answer or are not qualified to answer, say so. Try not to give misinformation. Answer b) is incorrect because your supervisor is not a physician and is not qualified to provide the appropriate answer.

7. Answer b) is correct. Take notes to document details for the record, and to show your willingness to see that the problem is resolved.

   Answer a) is incorrect because you should make eye contact with the customer as part of positive body language. Also, lean forward, nod, and look interested. Answer c) is incorrect because you should not interrupt, argue, or debate. Your main purpose is to listen so that you can understand the customer's complaint.

8. Answer a) is correct. Resolve the complaint right then and there if you can do so. It's best not to put off the customer while waiting for a resolution.

   Answer b) is incorrect because it's best to solve the complaint immediately. If you can't, refer it to your supervisor with written details of the complaint. Answer c) is incorrect because complaints should be resolved as soon as possible, before your next visit to the property.

9. Answer d) is correct. Good communications are necessary for pest management to work well, and it can cut callbacks and prevent contract cancellation, inform customers of their responsibilities for pestproofing, describe how long before the customer should expect to see results, and handle a number of other tasks.

10. Answer a) is correct. You should try to leave an account in the condition you found it by cleaning up the mess but do not try to hide the accident. A customer can understand you having an accident, but customer will be quite angry if they discover that you tried to "put one over" on them.

    Answer b) is incorrect because, although you may need to notify your supervisor, you still need to acknowledge the accident to your customer as soon as possible so it is you informing the customer of the accident rather than the customer finding out by himself. Answer c) is incorrect because it implies that you have had no role in the accident, or are not responsible for cleanup, and, besides, would leave a mess.

11. The correct answer is b). Always listen carefully to the complaint. You are being courteous to the customer, you are defusing the customer's anger, and you are gathering information.

    Answer a) is incorrect because, while you may not want to admit fault, you should still listen to the complaint. Answer c) is incorrect, because you should never interrupt you customer, it will likely increase the customer's anger, just listen courteously and respond where appropriate.

12. Answer b) is correct. Every complaint requires some sort of a response. You should never do nothing.

13. Answer c) is correct. If you resolve a complaint, you will typically create more loyalty from that customer than if the problem had never occurred.

    Answer a) is incorrect because a complaint that is resolved satisfactorily to both sides almost never leads to a cancellation. Answer b) is incorrect because it is usually better to resolve the complaint on the spot if you can.

14. Answer c) is correct, because it is false that you can leave blank spaces on a preprinted form. There is no way to tell if you left it blank because it was not applicable or because you made a mistake. Insurance claims and lawsuits often are decided because a technician left blank spaces or used ditto marks on a preprinted form. Answer a) is true because written reports, logs or recommendations are useless if illegible. Answer b) is true because being able to identify a technician and a date is essential in case of disputes.

1.4 TELEPHONE ETIQUETTE

1. Answer c) is correct. Amazingly, market research shows that 85 percent of customers rank telephone courtesy high in their decision on who they do business with.

    Answer a) is incorrect because the actual figure is over five times higher. Answer b) is incorrect because the actual figure is much higher.

2. Answer c) is correct because both a) and b) are true. Not only is your company's reputation on the line with each incoming call (b), but market research has shown that fifty percent of customers will refuse to do business with a company if they feel that they received poor service on the phone (a).

3. Answer b) is correct. This statement is false because it's better if you pick up after the second ring. Answering the phone too soon can make callers uneasy. They may not yet have prepared their response to your "Hello."

4. Answer b) is correct. The time is not something that your customer needs to know as part of your phone greeting.

    Answer a) is incorrect because you should provide both your first and last name. Answer c) is incorrect because your position in the company should be included when you answer the phone. Give the caller your title or your department or office.

5. Answer a) is correct. This statement is true because some people are offended by such informality. Few people mind being addressed formally.

    Answer b) is not true because if a caller doesn't provide a name, you should ask for it right away and write it down. Answer c) is not true because you should always return a call right away. Not returning a call is a quick way to lose a customer.

6. Answer c) is correct. Clearly write out the name of the caller, phone number, time of original call, time for return call, property address, a clear message, and your name.

    Answer a) is incorrect because you should set a mutually convenient time for the call when the customer will be available. Answer b) is incorrect because the callback should be made by the employee best able to deal with the problem, not necessarily the office manager.

7. Answer a) is correct. Always first ask the caller for permission to place them on hold. Some may prefer to call back.

    Answer b) is incorrect because you should return to callers on hold every 20-30 seconds so they know they're not forgotten. On average, a caller will hang up after being left on hold for a minute. Answer c) is incorrect because no customer should be left on hold for 5 minutes.

8. Answer b) is correct. This statement is false because you should always be courteous and helpful, even when your caller is abrupt or rude. Asking a customer to call back will only breed ill will. Treat the customer with respect and attempt to solve the problem.

1.5 SALES TECHNIQUES

1. Answer a) is correct. This statement is true because a hot prospect is a person most likely to hire your services. Selling time is best spent on hot prospects.

2. Answer a) is correct. A person who has been recommended to your company is a hot prospect. That person already has positive feedback about your company's work.

   Answer b) is incorrect because a person happy with their current pest control company has no motivation to change and is a cold prospect. Answer c) is incorrect because a person planning to move is not likely to contract for pest control service and is a cold prospect.

3. Answer c) is correct. A person having money problems probably is not going to commit to pest control service and is a cold prospect.

   Answer a) is incorrect because a person who has a fear of pests is highly motivated to contract for pest control service and is a hot prospect. Answer b) is incorrect because a person who is unhappy with their current pest control service is shopping around for a new contractor and is a hot prospect.

4. Answer a) is correct. Your current satisfied customers are good sources of referrals. Leave business cards and ask customers if they know anyone who might need your services.

   Answer b) is incorrect because a customer who has cancelled your service in the past is not likely to recommend you to others. Answer c) is incorrect because a referral comes from a person that knows both you and the prospect. You might get a sale, but it won't be a referral, by going door to door.

5. Answer c) is correct. A person who has indicated a high tolerance for pests and no need for your service probably will not change and will not become a hot prospect in the future.

   Answer a) is incorrect because a customer who has a year to go on their warranty is a cold prospect now but will become a hot prospect soon. Answer b) is incorrect because the situation of a person who did not have money earlier (a cold prospect) could change. That person could become a hot prospect.

6. Answer b) is correct. A cold call is personal contact with an unknown prospect that no one has directed you to, and you do not know his/her pest control needs.

   Answer a) is incorrect because this person is a referral, a hot prospect that you get from a person that knows both you and the prospect. Answer c) is incorrect because someone that has contacted you for service is a hot prospect that is already motivated for the sale.

7. Answer b) is correct. To maximize your effort and minimize the time taken, make cold calls in a concentrated geographic area based on your company's marketing plan.

   Answer a) is incorrect because making random calls in many different geographic areas isn't a good use of time. Answer c) is incorrect because you should make cold calls in your company's existing routes where new accounts can be handled most profitably.

8. Answer a) is correct. This statement is true. Cold calls do not often result in a direct sale but many will raise a prospect from cold to at least warm.

9. Answer c) is correct. The questions and objections portion of a sales presentation allows the prospect to receive answers to concerns before the closing.

   Answer a) is incorrect because application of pesticides is the job of the service technician once the account is activated and not the job of the sales representative. Answer b) is incorrect because you shouldn't "argue" with a prospect, you should answer questions and respond to objections.

10. Answer b) is correct. This statement is true because in the opening part of the sales presentation, you should introduce yourself, explain your presence, and put your prospect at ease.

    Answer a) is not true because the opening should be short so that you can move quickly into the inspection and questions. Answer c) is not true because presenting the solution for the problem should be part of the recommendation section of your presentation, after you have conducted the inspection and asked questions.

11. Answer c) is correct. Trying to keep the sales prospect off guard is not a reason to ask questions. Your job is to put the prospect at ease, reduce apprehension, and explain carefully.

    Answer a) is incorrect because asking questions will give you information about who decides on the buying, when the decision will be made, etc. Answer b) is incorrect because asking questions of your prospect helps to keep the prospect involved and interested in the sales presentation.

12. Answer a) is correct. The recommendation part of the sales presentation should describe the problem, present the solution, and clearly state the benefits of your company's service.

    Answer b) is incorrect because the final close should be at the end of your presentation. Answer c) is incorrect because it is during the opening portion that you should explain how you came to be referred to the prospect.

13. Answer b) is correct. Jot down notes of important points that your prospect is making. Prospects appreciate that.

    Answer a) is incorrect because you should not interrupt the prospect during the questioning portion. Follow the 80/20 rule of sales; listen 80% of the time; talk only 20% of the time. Answer c) is incorrect because the proposal for signature should be presented at the final close portion of your sales presentation, not during the questioning portion.

14. Answer b) is correct. Questions and objections should be seen as an indication of the prospect's interest and involvement. If your prospect is not asking questions, you are probably not getting through.

15. Answer c) is correct. This statement is false because giving the names of other satisfied customers is one of the best ways to overcome prospects' objections and concerns.

    Answer a) is true because questions and objections are a guide to what your prospect is thinking. Answer b) is true because taking the time to obtain information about the structure and the pests at the site is essential for sales success.

16. Answer a) is correct. Use a trial close question early in the presentation if you can. If the prospect responds favorably, proceed to your final close. If the prospect responds negatively, continue with your presentation.

17. Answer b) is correct. Conducting an inspection should have been done much earlier in the sales presentation, not during the final close.

    Answer a) is incorrect because presentation of a written proposal or agreement for signature is part of the final close. Answer c) is incorrect because offering a range of options and pricing is part of the final close.

1.6 SALES TACTICS FOR TECHNICIANS

1. Answer d) is correct because answers a), b), and c) are all true. Technicians are on the forefront. On their day-to-day service calls, they see many pest situations, talk to many people, all of which offer the possibility of new accounts. They work where the action is, they know what pests are "hot" and so what pests prospects might be worried about at the time, and they are familiar with their service area so they know what changes might be affecting pest problems in the area.

2. Answer a) is correct. Technicians should pretend they are seeing the account for the first time. Look at it with fresh eyes and you may uncover new pest problems, including those not covered under the existing service contract, such as carpenter ants, termites, pest birds, or fleas.

    Answer b) is incorrect because cold sales calls are best left to professional sales people. Answer c) is incorrect because not many sales people would like it if their best prospects were taken from them! Answer d) is obviously incorrect.

3. Answer a) is correct. On their day-to-day service calls, technicians see many pest situations and talk to many people with pest problems who are "hot leads" for new business.

    Answer b) is incorrect because cold sales calls are best left to professional sales people. Answer c) is incorrect because technicians can and should provide leads to the sales force.

4. Answer d) is correct because a), b), and c) are all true. Technicians can often find sales opportunities in their existing accounts for pests not covered under current service agreements, typically that would include termites, carpenter ants, powderpost beetles, and other wood destroying pests, moisture control, flea control, bird control, mosquito control, and tick control.

5. Answer a) is correct. If you find a new pest problem not covered by the current service agreement, you are doing your customer a favor by reporting it, and you are potentially getting your company new business.

    Answer b) is incorrect because you are the expert, your customer isn't. He may not discover the problem until it becomes more serious or causes damage. Answer c) is incorrect, because you shouldn't provide service that is outside your service agreement if it can be sold as an add-on or as a separate service.

6. Answer b) is correct. It is easiest to sell service when a customer is immediately aware of the pest problem. If you can sell jobs, now is the time to act. If not, at least pass the information on to the sales force and explain to your customer that he will be contacted soon.

   Answer a) is incorrect because it is poor sales practice to leave contact up to the customer. Answer c) is incorrect because you shouldn't provide service that is outside your service agreement if it can be sold as an add-on or as a separate service.

7. Answer a) is correct. The statement is true because not only may your company be able to sell a bed bug job for the site where you found bed bugs, but in adjacent units next door, above, and below, and perhaps throughout the building. Bed bugs are much more likely to be found in nearby units when a location is found to be infested.

8. Answer a) is correct. The "clover leaf" sales system is simply making a sales call or offer of inspection to the accounts next door to and across the street from an account.

   Answer b) is incorrect because highway clover leafs have nothing to do with sales systems. Answer c) is incorrect because while four-leaf clovers are associated with luck, luck has little to do with sales success.

9. Answer c) is correct. Occasional pests that enter structure from the perimeter such as mites, crickets, millipedes, elm leaf beetles and the like, usually affect a large area. If your customer is experiencing problems with them, it is likely that the neighbors are too.

   Answer a) is incorrect because, although it is possible that a neighbor is ultimately the cause of certain perimeter pests, such as elm leaf beetles, from a sales standpoint answer c) is much more important. Answer b) is incorrect because it not likely nor very useful.

10. Answer a) is correct. Building renovations often flush rodents into a neighborhood as they lose harborage during demolition, excavations, and utility work.

    Answer b) is incorrect because the occupants may be new or not, may be customers or not. The big issue is rodent dispersal. Answer c) is incorrect because it is not a major issue. The big issue is rodent dispersal.

11. Answer b) is correct. Answer a) is incorrect because the assumption of new ownership cannot be made from renovation. Answer c) is incorrect because the renovations may be fixing any problems.

12. Answer b) is correct. When soil near the foundation is disturbed, any existing termiticide barrier will be broken, and the warranty will be void. The structure will require a spot treatment. Answer a) is incorrect because foundation renovation imply nothing about whether the occupants or owners are new, and it is insignificant anyway. Answer c) is incorrect because even if foundation renovation were necessary because of moisture problems, they would no be fixed, and the issue is insignificant anyway. It's the break in the barrier that is important for potential new termiticide spot-treatment.

13. Answer a) is correct. In many cases, a resident or business manager will want to eliminate a stinging insect problem immediately, and may use your service even if they are under contract with another company, just to avoid delay.

    Answer b) is incorrect because, although it might be true it also might not, and the bigger issue is making an immediate sale. Answer c) is incorrect because you are in pest management, why would you want to stay away from a possible job? In fact, you might be blamed for not reporting the problem and offering to deal with it.

study guide

Chapter 2

PESTICIDE APPLICATION TECHNIQUES & EQUIPMENT

2.1 INTEGRATED PEST MANAGEMENT

1) Integrated Pest Management is a system that was originally designed for agriculture uses over 50 years ago. IPM focuses on managing pests through removal of habitat, food and water. IPM includes:
   a) inspection
   b) identification
   c) establishment of threshold levels
   d) implementation of control measures
   e) monitoring the effectiveness of the controls

2.2 INSECTICIDE BAIT APPLICATION

1) An insecticide bait application is the placement of a food attractant bait into specific sites that vary depending on the pest being baited. Baits come in different formulations including:
   a) Gel bait, especially for cockroaches and ants.
   b) Liquids, especially for ants, for use in bait stations.
   c) Containerized bait stations for cockroaches and ants.
   d) Granules, from very fine to coarse, for ants, cockroaches, crickets, and other pests.
   e) Sealed tubes for termite control.

2) Gel baits are usually applied using a crack and crevice injector tip.
   a) Some are prepackaged in their own syringe-type applicators
   b) Others are packaged in tubes designed for use with a special injector "gun."

3) Containerized baits are placed along foraging routes of pests or in hiding areas such as the back corners of kitchen cabinets.

4) Most granular baits are scattered by hand, applied with a granular spreader, or placed in bait stations although very fine granule baits can be applied using a crack and crevice injector tip.

5) Termite baits are usually impregnated into cellulose materials in sealed tubes which are installed in the ground or above ground on infested wood.

6) Coarse granular baits are used mainly for outdoor cockroaches, crickets, and other outdoor perimeter pests.

7) Insecticide gel and container baits are used primarily for cockroaches, ants, and termites.

8) For cockroaches, gel baits are applied as small spots or beads in or near dark, protected harborages, or aggregation sites where spotting is seen.
   a) Typical baiting sites are in cracks and crevices or small voids such as pipe chases, inside and behind cabinets, under sinks, in drawer slides, behind back splashes, and behind and under appliances.
   b) Gel baits should be reapplied only as needed.
   c) In heavy infestations more bait placements need to be made since the pests might consume all of the bait before the next service visit.

9) For ants, gel baits are applied on the ants' foraging trails, near feeding sites, nest sites, or near entry points or water sources.
   a) Ant baits may have to be switched periodically since their feeding preferences often change seasonally.

10) Baits eventually can get old, dry, greasy, or dusty.
   a) Old bait should be cleaned up periodically and fresh bait applied.

11) The advantages to insecticide baits are:
    a) They can be placed specifically where pests are found or are hiding.
    b) Baits have low toxicity, so if properly applied in out-of-the-way sites, they pose little hazard to people, pets, or nontarget surfaces.
    c) Baits are generally odorless with no airborne solvents.
    d) Baits are ready-to-use.
    e) Baits are nonrepellent to pests.
    f) Baits are long-lasting.

12) Disadvantages to baits are that:
    a) Some can stain light-colored or porous surfaces.
    b) Most baits are pest-specific and so will not control pests other than the targets.
    c) Proper bait application can take longer than a traditional spray application.
    d) Bait should not be applied in the same sites where insecticide sprays have been applied.
    e) Routine cleaning can remove bait applications.
    f) Baits are slower-acting than many pesticides.

2.3 RODENTICIDE BAIT APPLICATION

1) There are significant differences in the biology of rats and mice that should make baiting strategies against each very different.

2) A mouse seldom travels more than 20-30 feet from its nest; a rat's home territory is much larger, and it will commonly travel 100 feet in its evening travels.
    a) Mice require many baiting sites, at least one placement wherever you find evidence of activity, in order to provide bait to all the mice in an area. As an alternative, space bait placement every 10 feet.
    b) Rats require fewer baiting sites (typically spaced every 25 to 50 feet), but exterior inspections are essential because rats can be foraging for long distances from nest sites around a dumpster, up in a tree, or down in a sewer.

3) Mice are curious about new objects in their territory; rats have a fear of things new and foreign in their territory, and are very cautious.
    a) When baiting for mice, disturb their environment as much as possible. Move baits around at each service. Mice will investigate the changes and include bait sites into their territories.
    b) When baiting for rats, disturb the rat's environment as little as possible. Avoid moving bait stations, and consider prebaiting with nontoxic food to acclimate the rats to bait stations and activity.

4) Mice are nibblers, rats often consume large quantities at a single feeding.
    a) Use single-feeding rodenticides in many small placements in many sites when baiting for mice.
    b) For rats, put effort into finding a bait material that the rats will accept (put out different baits to find the best acceptance), and place large amounts in major travel or feeding areas.

5) To promote feeding on baits, reduce the rodents' natural food through good sanitation practices and trash handling.

6) Don't limit bait placements to ground level: both rats and mice live in three dimensions and may be located in suspended ceilings, attics, crawlspaces, cooler tops, etc.

7) In situations where water is scarce, liquid baits are often preferred by rodents over dry baits

2.4 CRACK & CREVICE APPLICATION

1) A crack & crevice treatment is the application of a small amount of pesticide into cracks and crevices, behind and between objects, and into inaccessible voids.
   a) Crack & crevice applications are used most often for control of cockroaches, and also for earwigs, silverfish, bed bugs, and other pests that hide in hidden locations.
   b) A crack & crevice application places a pesticide precisely in areas where pests hide, move, or enter a building while keeping the pesticide away from surfaces, people, pets, and other non-targets.
   c) Pesticide residues in cracks and crevices tend to last longer because they are protected from disturbance, moisture, dust, and grease.

2) Some crack & crevice applications are designed to flush pests out of hiding during inspection.

3) Proper crack and crevice technique requires that technicians inject pesticides only **into** cracks and crevices, with very little residue applied to exposed surfaces.
   a) Treatment can only be accomplished with a special crack & crevice injector tip.
   b) Pin stream nozzles can not be used to apply crack and crevice treatment because they don't apply pesticides deep inside the crack and they apply significant residues onto surrounding surfaces.

2.5 VOID APPLICATION

1) A void application is a pesticide treatment in a hollow, enclosed space.
   a) Voids may be large such as hollow wall voids or inside suspended ceilings, or small such as a hollow table leg or inside a piece of equipment.
   b) Void applications of insecticides are used for control of cockroaches, ants, bees and wasps, and some overwintering pests like cluster flies.
   c) Void applications of tracking powders are used to control rodents

2) Some void treatments are used to flush insects from the void for inspection and monitoring.

3) A void application places pesticide precisely in the areas where pests hide or move while keeping pesticide away from people, pets, and nontarget surfaces.
   a) Treatment is usually done using an injector tip and low pressure.
   b) Some voids can be directly accessed through switch plates, cracks, or other existing openings, but you may need to drill a hole to reach sealed voids.

4) Insecticide dusts are often the best way to treat voids. Dusts drift to fill the void space better than liquids and pests pick up the dust on their bodies.

5) Advantages to void treatment are that pesticide residues are out of the reach of people and pets, and pesticides tend to last longer in voids where they are protected from disturbance, moisture, dust, and grease.

6) Disadvantages to void treatment are the following:
   a) You may have to drill to access voids.
   b) The voids may be blocked by insulation and cross braces.
   c) Spray or dust may drift out of voids into nontarget rooms.
   d) Contractors may contact pesticide residues when they access treated voids for repairs.

2.6 SPOT APPLICATION

1) A spot application is a pesticide treatment to a limited area, not to exceed two square feet.
   a) The spot can be any shape. For example, a "spot" can be a rectangle 2 feet by 1 foot, or a strip 6 inches wide by 4 feet long, or even a circle about 19 inches in diameter.
   b) Spots may not be continuous but may occasionally touch each other, such as around a door frame.
   c) Typical spot application sites include a wall/floor junction, around doorways or baseboards, around water pipes, at the base of a piece of equipment, or around foundations.

2) A spot application allows you to apply pesticide to small, localized areas where pests gather rather than treating a large area.

3) Spot treatments are made to sites where insects will walk across treated areas, to baseboards, and to points where pests enter from outdoors.

4) Spot treatments are used primarily to control occasional invaders such as crickets, spiders, scorpions, millipedes, pillbugs, etc.

5) Spot treatments are most often applied with a compressed air sprayer and a fine fan or coarse fan nozzle but can also be applied with a pressurized aerosol.

6) The main advantage to spot treatments is that you can treat many pest sites in a short period of time while applying pesticide only in targeted areas.

7) Disadvantages to spot treatment are the following:
   a) Spot application leaves pesticide on surfaces which may not be desirable in sensitive sites.
   b) Technicians sometimes ignore the definition of a "spot" and instead apply the pesticide to continuous broad areas which may be a violation of the label.
   c) Many pesticide labels do not allow spot application in food areas.

2.7 DIRECT BROADCAST APPLICATION

1) A direct broadcast application (also called a general application) is a uniform treatment over an entire, usually large, surface area.
   a) A direct application can provide a quick kill for certain pest problems where a more precise application is not possible, or can prevent exposed pests from moving into other areas.
   b) Direct broadcast applications are used indoors primarily to control fleas and outdoors to control various lawn and perimeter pests.
   c) Broadcast applications can be made with liquids or granules (outside).

2) Liquid insecticide applications are usually done with a wide angle flat fan tip and a pressure of about 20 psi, but with some equipment higher pressures are used.

3) Typical direct broadcast application sites are walls, floors, ceilings, lawns, and the perimeter of a building.

4) A perimeter treatment, also called a barrier treatment, is a direct broadcast application of a pesticide around the exterior perimeter of a structure to kill or repel pests that might enter the structure.
   a) When applying a liquid perimeter treatment, the applicator typically sprays a swath of ground 2-10 feet out from the structure, the building wall from the ground up a few feet (depending on the label), and sometimes a narrow barrier around doors, windows, and other potential entry points for pests.

5) The primary advantages of a direct broadcast application are that it covers a large area in one treatment, usually results in immediate kill of exposed pests, and delayed kill or repellency for the useful life of the residual.

6) The main disadvantages to direct broadcast application are the following:
   a) It typically applies a large amount of pesticide.
   b) Pesticides are applied to open surfaces that can be accessible to non-targets, people, and pets.
   c) The pesticide may be exposed to air, dust, sun, rain, and other factors that shorten its residual life.
   d) Outdoor applications may be susceptible to runoff.
   e) If spray swaths do not overlap properly, you can apply either too much or too little.
   f) Broadcast application is not allowed in food areas.

2.8 SPACE APPLICATION

1) A space treatment is the application of a fine aerosol mist of insecticide into the entire airspace of a room or targeted to a limited airspace inside equipment or under a sink.
   a) The treatment can be done by aerosol, mechanical aerosol, ultra-low volume (ULV) or fogging.
   b) A space application uses small airborne droplets of a nonresidual (usually) insecticide to control flying and crawling insects that are exposed to it.
   c) Some insect growth regulators (IGRs) are also applied by space application.
   d) Space treatments are used mostly to control flies and stored product pests.

2) A space treatment is done with specialized fogging or aerosol-generating equipment and requires precise calculation of the volume of the treated space in order to ensure a legal an effective dosage.

3) Space treatment of a whole room must be done when the facility is not in operation and workers are not present.
   a) Exposed foods must be removed or covered **before** treatment and food handling surfaces must be cleaned **after** treatment.
   4) The primary advantages of space application are that it can treat a large area in a short period of time, it provides quick kill, and the insecticide covers all surfaces.

5) The primary disadvantages of space applications are that:
   a) Pests that are hidden inside voids, closed closets, equipment, cabinets, etc. are protected from the insecticide and probably will not be killed.
   b) The application is not targeted to specific pest sites so much of the insecticide falls in areas where pests are not present.
   c) In most cases, there is no lasting insecticide residual to continue killing pests.
   d) The insecticide can drift into nontarget areas.

2.9 COMPRESSED AIR SPRAYERS

1) The basic parts of the compressed air sprayer are the tank, pump, discharge hose, valve, and nozzle.
   a) Many sprayers are equipped with a pressure gauge so that you can regulate the tank pressure for best application results.

2) The compressed air sprayer should never be filled to the top; there must be an air space above the liquid for the sprayer to pressurize and operate properly.

3) Different nozzles produce different spray patterns: fan sprays for spot and broadcast applications, injector tip and pin stream for crack and crevice and void application.
   a) Fan spray nozzles are generally used at 20-40 psi, pin stream and injector tips at 20 psi or lower.

4) Most sprayers are equipped with a strainer to screen contaminants and keep the nozzle clear.

5) Compressed air sprayers in regular use require weekly cleaning and daily maintenance checks.
   a) To clean a compressed air sprayer, fill the empty tank one-half full of water with a tablespoon of detergent. Spray the soapy water out of the nozzle for one minute. Remove the strainer and nozzle and scrub them with a soft brush. Use a long-handled brush inside the tanks. Rinse thoroughly.
   b) Do not use ammonia to clean a sprayer, it is corrosive and can damage certain sprayer parts. Use plain detergent or a specialty tank cleaning product.
   c) Inspect the sprayer each day for damage or excess wear to check valve, plunger cup, and hose; pump the sprayer to high pressure and check for leaks.

6) Common sprayer problems, causes, and solutions include the following:
   a) If liquid leaks or sprays around the plunger handle, the check valve is worn, damaged, or not seated properly.
   b) If spray comes out at low pressure or dribbles out, the strainer is probably clogged.
   c) If, no matter how hard you pump, you get no pressure in the tank, there is a problem with the pump cup.
   d) If air but no spray comes out of the nozzle, but the tank isn't empty, then the siphon tube (supply tube) is broken or pitted.
   e) If there is good pressure, but the spray pattern in uneven, then the nozzle is clogged or worn out.

2.10 POWER SPRAYERS

1) Power sprayers are used for termite control, lawn care, and perimeter treatments because they can apply far more pesticide in a given time than can hand sprayers.

2) High pressure in power sprayers means increased risk of leaks, spills, splashback, airborne residues, and drift, including drift back onto the applicator.

3) Run through an inspection checklist before each job using a power sprayer.

4) Inspection of a power sprayer should include the following:
   a) Check for cracked, split, or damaged hoses, cracked fittings, broken regulators and gauges, damaged tanks, and any other signs of defect or wear.
   b) Check oil and water levels in gasoline-powered engines.
   c) Lubricate fittings as needed.
   d) Set bypass and other valves properly, check that no lines are plugged or hoses kinked, and inspect the pressure relief valve on the discharge.
   e) Start up the unit and let it run for a few minutes, checking for leaks and making sure it is operating properly.

5) Before servicing a power sprayer, disconnect any electric power, release all pressure, and drain all pesticide liquids from sprayers.

6) Never operate a gasoline-driven sprayer inside an enclosed or unventilated area or you could generate life-threatening fumes and gases.

7) For high-pressure pumps, secure the discharge line before starting; otherwise, it could whip around and cause injury or damage.

8) When power-spraying attics or crawlspaces, or at commercial and industrial sites, watch out for electrical circuits, (to avoid electric shock) and pilot lights and other sources of ignition (flammable sprays can ignite, nonflammable sprays can extinguish pilot lights).

2.11 DUSTERS

1) Fill a hand-held duster only half full.
   a) The base of the spout should be above the level of the dust. (If the base of the spout is buried in dust, the air in the duster can't mix with the dust.)
   b) You need the remaining empty space in the duster so that air can mix with the dust to give a fine application.
   c) If there is too much dust in the duster, you'll apply clumps.

2) Don't remove the screen inside the duster (unless the pesticide label says to) since it helps keep the dust from clumping.

3) Shake a hand-held duster lightly before each application to mix the dust and air, and to keep clumps from forming.

4) Add a couple of small ball bearings, marbles, or coins to your duster. This not only helps to agitate the dust inside, but also gives the dust an electrostatic charge so that it sticks better to surfaces.

5) Apply a **light** film of dust; heavy applications actually repel pests and increase the risk of drift into nontarget areas.
   a) Squeeze the duster lightly to apply a thin film. When a hand-held duster is squeezed correctly, you will just barely be able to see the dust coming out of the tip.
   b) The larger the crack or void being treated, the harder you will have to squeeze to force dust onto all surfaces.
   c) Pull the nozzle away from the crack or opening before you completely relax your squeeze. This prevents sucking dust or moisture back into the duster.
   d) Carry a damp cloth to wipe up any excess dust that spills onto surfaces.

6) When working in crawlspaces, attics, and similar sites, turn off fans, ventilators, furnaces, and other air circulation equipment that could blow the dust into nontarget areas.

7) Do not use a duster to apply an insecticide if it has been used previously for applying rodenticide tracking powder or the tracking powder residue could be applied in an illegal location.

8) When treating voids or areas smaller than attics or crawlspaces with a power duster, use a lower pressure to reduce the chances of the dust drifting into nontarget areas.

2.12 RODENT BAIT STATIONS

1) Rodenticide bait stations serve three purposes:
   a) They reduce the risk that children, pets, livestock, and wildlife can be poisoned accidentally.
   b) They protect baits from the elements and help keep baits fresh and attractive to rodents.
   c) They monitor rodent activity through droppings, gnaw marks, and bait consumption.

2) Rodent bait stations can also hold snap traps and glue boards and protect them from view or tampering.

3) A rodenticide must be placed inside a "tamper-resistant" bait station if a risk exists that children, pets, and other non-targets could access the bait.

4) Rodenticide labels also require that a bait station be secured or otherwise immobilized whenever two conditions exist:
   a) A risk exists that children, pets, and other non-targets can get at the bait station.
   b) The station is so designed that bait can be shaken out of it.

5) There are a number of different strategies when installing bait stations:
   a) Bait stations can be placed around a perimeter of a facility to intercept rodents before they enter.
   b) Bait stations can be placed along rodent travel paths in existing infestations.
   c) Bait stations can be placed near high activity areas such as feeding and nesting sites.
   d) Bait stations are most effective when placed in corners, against walls, or beneath and between items of furniture, equipment, boxes, etc. where rodents commonly travel.

6) The following restrictions apply when applying professional-use rodenticides:
   a) All applications must be made inside a building or within 100 feet of a building or a man-made structure such as a dumpster enclosure or shed.
   b) All products used outdoors and above ground must be placed within 100 feet of a building or other structure.
   c) A fence is not considered a manmade structure so you cannot bait along a fence if it is farther than 100 feet from a building or structure.
   d) Outdoor above-ground applications must be made inside tamper-resistant bait stations.
   e) Rodenticide blocks, soft baits, or place packs may not be used to bait burrows.

7) Technicians should brush out their stations, or remove the loose trays and dump the debris out of them for the following reasons:
   a) New rodent droppings mean that the station is active.
   b) Careful inspection of the new droppings can determine what kinds of rodents (or other species) have been feeding recently, and sometimes even their ages and conditions.

8) Fill out the service record in or on the station after each service.

9) Check the bait to be sure it is still in good condition.
   a) Two months is about all you can expect from a block or a loose bait before it begins losing palatability.

2.13 CALIBRATION

1) Most pesticide application equipment requires regular calibration to insure that the correct volume of material is applied.
   a) Poorly calibrated equipment can mean too much pesticide has been applied, which is illegal as well as expensive, or that too little has been applied, which can mean a control failure.
   b) Even sprayers equipped with a flow meter require periodic calibration because a flow meter can get out of adjustment during day-to-day operations, and may be affected by temperature and pump pressure.

2) To check the accuracy of a power sprayer, such as a termite rig, equipped with a flow meter, fill a five-gallon bucket to a predetermined one-gallon mark and see if the meter agrees.
   a) If the meter does not read close to 1 gallon, follow the calibration adjustment instructions for that particular flow meter.

3) If the sprayer does not have a flow meter, do the following:
   a) Adjust the pump to the pressure you will be using (say 25 psi).
   b) Measure the number of seconds it takes to pump one gallon into a marked bucket. That figure is the "seconds per gallon" your sprayer will apply.
   c) Repeat a couple of times to make sure the equipment is consistent.

4) The "seconds per gallon" figure may be different for each tip or application tool that you use, and will often change if you change the pressure significantly.

5) To calibrate a compressed air sprayer, do the following:
   a) Mark an area of 10 feet by 10 feet (100 square feet).
   b) Fill a clean sprayer with water to a known mark.
   c) Spray the area using your normal technique.
   d) Refill the sprayer, measuring the amount of water required to refill to the original level. That is the amount of material the sprayer will apply to 100 square feet.
   e) Divide by 100 for the application rate per square foot.

6) The simplest method of calibrating a granule spreader is to measure the quantity of granules applied to a known area. Here is how (sample figures included):
   a) Put a known amount of granules, say a half pound, into the hopper of the spreader.
   b) Set what you believe is the proper spreader adjustment.
   c) Apply all the granules while walking at normal speed in a straight line.
   d) Multiply the length of the distance you applied (say 83 feet) times the swath width of the spreader (say 6 feet) for the total application area (83 x 6 = 498).
   e) You now know that the application rate of the spreader at that setting with that particular product is 1/2 pound per 498 square feet, or approximately 1 pound per 1,000 square feet.

study questions

Chapter 2

PESTICIDE APPLICATION TECHNIQUES & EQUIPMENT

2.1 INTEGRATED PEST MANAGEMENT

1) Rather than indiscriminate use of pesticides, service technicians should:
   a) do preventative insecticide applications along all baseboards.
   b) use Integrated Pest Management philosophies.
   c) put out bait stations every three feet

2.2 INSECTICIDE BAIT APPLICATION

1) Which type of bait is most commonly used to control outdoor pests?
   a) granular bait
   b) paste bait
   c) gel bait

2) Which one of these is the best site for gel bait application to control cockroaches?
   a) along baseboards
   b) behind kitchen cabinets
   c) inside stoves

3) Cockroach gel baits will also kill ants, millipedes, and other occasional indoor invaders.
   a) true
   b) false

4) When should gel bait normally be replaced?
   a) monthly
   b) quarterly
   c) as needed

5) In a heavy German cockroach infestation in a kitchen, a technician should:
   a) apply larger beads of gel bait
   b) apply more beads of gel bait
   c) apply granular bait

6) Which statement about gel baits is false?
   a) gel baits can eventually dry out
   b) gel baits are slow-acting
   c) gel baits are quite toxic to pets

7) Why might the type of ant food bait need to be changed periodically?
   a) ant larvae eat different food than the adults
   b) ant feeding preferences can change
   c) ants develop resistance to certain insecticides

8) An advantage to insecticide bait application is:
   a) baits take less time to apply
   b) baits can not be removed by regular cleaning
   c) baits have little or no odor

9) A disadvantage to insecticide bait application is:
   a) baits can stain some surfaces
   b) baits produce airborne solvents
   c) baits can be repellent to pests

10) Which statement about liquid insecticide baits is false?
   a) often used against ants
   b) often used against cockroaches
   c) applied inside bait stations

2.3 RODENTICIDE BAIT APPLICATION

1) The farthest a house mouse typically travels from its nest is:
   a) 20-30
   b) 50-60
   c) 100-150

2) A rat's territory typically ranges up to _____ feet from its nest.
   a) 20-30
   b) 50-60
   c) 100-150

3) Which statement about mice is false?
   a) Mice require many baiting sites
   b) Bait placements every 10 feet are recommended in infested areas
   c) Mice can be foraging from a building across the street

4) Which statement about rats is true?
   a) Exterior inspections are essential because rats can be foraging long distances
   b) Bait placements every 10 feet are recommended in infested areas
   c) Rats are curious about new objects in their territory

5) Which statement is accurate?
   a) Rats are nibblers
   b) When baiting for mice, disturb the environment as much as possible
   c) When baiting for rats, disturb the environment as much as possible

6) Which statement is false?
   a) For rats, put your effort into finding a bait material that the rats will accept, and place large amounts in major travel or feeding areas.
   b) To promote feeding on baits, reduce the rodents' natural food through good sanitation practices and trash handling.
   c) Limit bait placements to ground level because rats and mice primarily forage and nest at floor or ground level

2.4 CRACK & CREVICE APPLICATION

1) Which of the following is a typical crack & crevice treatment site?
   a) an inaccessible void
   b) a baseboard
   c) the underside of a kitchen cabinet shelf

2) Crack & crevice applications are commonly used to control
   a) fleas
   b) cockroaches
   c) spiders

3) Which statement is not true about crack and crevice treatment?
   a) It places a pesticide where pests hide, move, or enter a building
   b) It allows you to treat a large area in a short period of time
   c) It keeps the pesticide away from surfaces, people, pets, and other non-targets

4) Pesticide residues last _____ in crack and crevice treatments than they do in spot or general treatments.
   a) longer
   b) shorter
   c) approximately the same

5) Crack & crevice applications can also help in inspections by flushing pests out of hiding.
   a) true
   b) false

6) Proper crack and crevice treatment is done:
   a) with a pin stream nozzle
   b) with a crack & crevice injector tip
   c) at high pressure

2.5 VOID APPLICATION

1) Which of the following sites would be a good candidate for a void application?
   a) drop ceiling
   b) kitchen cabinet
   c) cereal box

2) Void applications are commonly used to control:
   a) stored product pests
   b) wasps
   c) ticks

3) Void applications can also help in inspections by flushing pests out of hiding.
   a) true
   b) false

4) Which statement is true about void applications?
   a) increase the risk of pesticide exposure compared to crack and crevice or spot treatment
   b) application usually requires an injector tip
   c) application requires access through switch plates, cracks, or other existing openings

5) Why are insecticide dusts often the best way to treat voids?
   a) dusts drift to fill the void space better than liquids
   b) dusts are less likely than liquids to drift out of voids
   c) dusts are more toxic to insects in voids than are liquids

6) An advantage to void treatment is:
   a) pesticides are protected from disturbance
   b) allows you to treat many sites in a short period of time
   c) voids can be treated with high pressure

7) A disadvantage to void treatment is:
   a) pesticides degrade quickly inside voids
   b) the voids may be blocked by insulation and cross braces
   c) there are few pests inside voids

2.6 SPOT APPLICATION

1) A spot application is a pesticide treatment to a limited area, not to exceed:
   a) 1 square foot
   b) 2 square feet
   c) 3 square feet

2) Which one of the following can be considered a proper area for a spot treatment?
   a) a rectangle 2 feet by 2 foot
   b) a strip 6 inches wide by 4 feet long
   c) a circle 24 inches in diameter

3) Which one of the following statements is **true** about spot treatment?
   a) spot treatment can only be used in residential sites
   b) spots may be continuous
   c) spots may occasionally touch each other

4) Which one of the following is a typical spot application site?
   a) building perimeter
   b) threshold of a doorway
   c) carpet

5) Which one of the following statements about spot treatments is **true**?
   a) often applied with a compressed air sprayer and a fine fan or coarse fan nozzle
   b) never applied with a pressurized aerosol
   c) most effective treatment technique for cockroach control

6) Which one of the following statements is **false**?
   a) spot application leaves pesticide residues on accessible surfaces
   b) spots may be strung together to create a continuous barrier
   c) many pesticide labels do not allow spot application in food areas

2.7 DIRECT BROADCAST APPLICATION

1) A direct broadcast application (also called a general application) is:
   a) a uniform treatment over an entire, usually large, surface area
   b) a directed space spray
   c) illegal indoors

2) Which one of the following statements is **not true** about direct broadcast application?
   a) can provide a quick kill
   b) provides a precise application of pesticide
   c) can prevent exposed pests from moving into other areas

3) Direct broadcast applications are used indoors primarily to control:
   a) fleas
   b) cockroaches
   c) flies
   d) none — cannot be used indoors

4) Which of the following statements is **not true** about direct broadcast applications outdoors?
   a) used for perimeter treatment
   b) either liquids or granules may be used
   c) liquids require high pressure for effective coverage

5) Which of the following statements is **true** regarding direct broadcast applications?
   a) liquid pesticide applications are usually done with a wide angle flat fan tip
   b) typical sites indoors are inside cabinets and underneath equipment
   c) there is minimal risk of runoff outdoors

6) A perimeter treatment, also called a barrier treatment, is defined as
   a) a direct broadcast application of pesticide to floors
   b) a direct broadcast application of pesticide to a band around the exterior perimeter of a structure
   c) a direct broadcast application to the south and west walls of a building for cluster fly control

7) Which statement best describes a liquid perimeter treatment?
   a) application to a swath of ground 2-10 feet out from the structure, and to the building wall from the ground up a few feet
   b) application to a one-foot wide swath around a structure
   c) application to door thresholds and around windows

8) Which of the following is an advantage to applying pesticides with a direct broadcast application?
   a) applies a large amount of pesticide
   b) covers a large area in one treatment
   c) sun, rain, and other factors degrade pesticide residues quickly

9) Which of the following is a disadvantage to applying pesticides with a direct broadcast application?
   a) typically covers a large area in one treatment
   b) outdoor applications may be susceptible to runoff
   c) residual will continue to kill or repel pests

2.8 SPACE APPLICATION

1) What is **not** a characteristic of a space treatment?
   a) application of a fine aerosol mist of insecticide into the entire airspace of a room
   b) can be targeted to a limited airspace inside equipment or under a sink
   c) insecticide will penetrate closed closets, equipment, and cabinets

2) Which piece of application equipment can be used to apply a space treatment?
   a) duster
   b) compressed air sprayer
   c) aerosol generator

3) What category of insecticide is typically applied as a space treatment?
   a) long-term residual
   b) nonresidual
   c) bait

4) Some insect growth regulators (IGR) can be applied as a space application?
   a) true
   b) false

5) Space treatments are most useful for which group of pests?
   a) flies and stored product moths
   b) cockroaches
   c) bed bugs and silverfish

6) Does space treatment require precise calculation of the volume of the treated space and, if so, why?
   a) no, it doesn't
   b) yes, because it is the only way to ensure a legal and effective dosage
   c) yes, because volumes over 5,000 cubic feet cannot be treated effectively

7) Which statement is correct?
   a) space treatment of a whole room must be done when the facility is not in operation
   b) space treatment of a whole room can be done when workers are present only if a pyrethrins product is used
   c) food-handling surfaces must be cleaned **before** treatment

8) Which is **not** an advantage of space application?
   a) you can treat a large area in a short period of time
   b) it provides quick kill
   c) insecticide does not penetrate into closed spaces or voids

9) Which statement about space treatments is **false**?
   a) relatively ineffective against pests hiding in voids and closed equipment
   b) targeted to specific pest sites so little insecticide is wasted
   c) the insecticide can drift into nontarget areas.

2.9 COMPRESSED AIR SPRAYERS

1) Besides the tank and pump, which one of these is a basic working part of the compressed air sprayer?
   a) valve
   b) strainer
   c) compressor

2) Many sprayers are equipped with a _____so that you can regulate the tank pressure for best application results.
   a) gauge
   b) valve
   c) strainer

3) A compressed air sprayer shouldn't be filled to the top.
   a) true
   b) false

4) Fan spray nozzles are best used for what type of application?
   a) broadcast application
   b) space application
   c) crack and crevice application

5) Fan sprays are generally applied at a pressure of
   a) 10-20 psi
   b) 20-40 psi
   c) 50 psi

6) Crack and crevice treatment is generally applied at a pressure of:
   a) 20 psi
   b) 40 psi
   c) 50 psi

7) What is the ultimate purpose of the strainer in a compressed air sprayer?
   a) release pressure
   b) keep the pesticide and water separate
   c) keep the nozzle clear

8) Compressed air sprayers in regular use generally require _____ cleaning.
   a) daily
   b) weekly
   c) monthly

9) Ammonia is the recommended cleaning agents for sprayer tanks.
   a) true
   b) false

10) Inspect the sprayer _____ for damage or excess wear to check valve, plunger cup, and hose; pump the sprayer to high pressure and check for leaks.
   a) daily
   b) weekly
   c) monthly

11) If liquid leaks or sprays around the plunger handle, then:
   a) there is a problem with the pump cup
   b) the siphon tube (supply tube) is broken or pitted
   c) the check valve is worn, damaged, or not seated properly

12) If spray comes out at low pressure or dribbles out, then:
   a) the strainer is probably clogged
   b) the nozzle is clogged or worn out
   c) there is a problem with the pump cup

13) If, no matter how hard you pump, you get no pressure in the tank, then:
   a) the nozzle is clogged or worn out
   b) there is a problem with the pump cup
   c) the siphon tube (supply tube) is broken or pitted

14) If air but no spray comes out of the nozzle, but the tank isn't empty, then:
   a) there is a problem with the pump cup
   b) the siphon tube (supply tube) is broken or pitted
   c) the check valve is worn, damaged, or not seated properly

15) If there is good pressure, but the spray pattern is uneven, then:
   a) the strainer is probably clogged
   b) the nozzle is clogged or worn out
   c) the siphon tube (supply tube) is broken or pitted

2.10 POWER SPRAYERS

1) What is the primary advantage of power sprayers?
   a) they can apply a lot of pesticide in a short period
   b) long hoses allow access to any site
   c) they can produce far higher pressures than can hand sprayers

2) What is the disadvantage to high pressure generated by power sprayers?
   a) increased risk of leaks and spills
   b) airborne residues
   c) drift
   d) all of the above

3) Power sprayers should be inspected:
   a) daily
   b) weekly
   c) before each job

4) What is the primary safety reason for starting up a power sprayer and letting it run for a few minutes before use
   a) to warm it up
   b) to check for leaks and other problems
   c) to build up proper pressure

5) Why should a gasoline-driven sprayer never be operated inside an enclosed building?
   a) it can generate dangerous fumes
   b) it could damage a customer's property
   c) it can generate damaging noise

6) Why must you secure the discharge line before starting a high-pressure pump?
   a) excessive back pressure can damage the pump
   b) it can increase the application rate above the permissible labeled rate
   c) it could whip around and cause injury or damage

7) Why should you still be concerned about pilot lights when power spraying indoors if you are using a nonflammable spray?
   a) nonflammable sprays can extinguish pilot lights, causing a problem later
___b) __**all** sprays are flammable to some extent
   c) some insecticides can corrode the metal in pilot lights

2.11 DUSTERS

1) Why should you fill a hand-held duster only half full?
   a) So you can squeeze it harder
   b) So you can turn it upside down
   c) so air can mix with the dust

2) The screen inside a duster:
   a) helps keep the dust from clumping
   b) needs to be removed for applying insecticide dust
   c) prevents contamination of the dust

3) What do you need to do before each application when using a hand-held duster?
   a) squeeze firmly
   b) turn upside down
   c) shake lightly

4) What is not a valid reason for adding a couple of small ball bearings, marbles, or coins to your duster?
   a) to agitate the dust inside
   b) to give the dust an electrostatic charge
   c) to replace the screen

5) What application position is best for a hand duster?
   a) with the base of the spout above the level of the dust
   b) with the dust covering the base of the spout
   c) whatever position produces the most dust

6) Why should you apply a light film of dust?
   a) you shouldn't
   b) so that the customer cannot see it
   c) heavy applications actually repel pests

7) When a hand-held duster is squeezed correctly:
   a) you will just barely be able to see the dust coming out of the tip
   b) a large amount of dust can be applied with one squeeze
   c) excess dust will be sucked back into the duster

8) You should pull the nozzle of a hand duster away from the crack or opening before you completely relax your squeeze.
   a) true
   b) false

9) What is the purpose of a damp cloth when using a duster?
   a) to wipe up any excess dust that spills onto surfaces
   b) to clean cracks and crevices of crud before application
   c) to wrap around the duster for better grip

10) Which statement about dusters is false?
   a) never use the same duster for both insecticide dusts and rodenticide tracking powders
   b) when dusting in the attic, you should turn on fans, ventilators, and other air circulation equipment
   c) the larger the crack or void being treated, the harder you will have to squeeze a hand duster to force dust onto all surfaces

11) When treating voids or areas smaller than attics or crawl spaces with a power duster:
   a) use a lower pressure to reduce the chances of the dust drifting into nontarget areas
   b) use a higher pressure to get good penetration
   c) treat until dust begins coming out of cracks, crevices, and power receptacles

2.12 RODENT BAIT STATIONS

1) Which of the following is not one of the primary purposes for using rodenticide bait stations?
   a) reduce the risk that children, pets, livestock, and wildlife can be poisoned accidentally
   b) protect baits from the elements and help keep baits fresh and attractive to rodents
   c) capture dead and dying rodents
   d) monitor rodent activity through droppings, gnaw marks, and bait consumption

2) Why might you install snap traps and glue boards inside a rodent bait station?
   a) there is no good reason
   b) to protect them from view or tampering
   c) to make them easier to service

3) When must a rodenticide be placed inside a "tamper-resistant" bait station?
   a) always
   b) whenever there is a risk that children, pets, and other nontargets could get at the bait
   c) in all residential areas

4) What needs to be done if a risk exists that children, pets, and other nontargets can get at the bait station, **and** it is possible for bait to be shaken out of the station?
   a) only blocks or water baits can be used in the station
   b) only snap traps or glue boards can be used in the station
   c) the bait station needs to be secured or otherwise immobilized

5) Which statement is false regarding application of professional use rodenticides?
   a) Outdoor above-ground applications must be made inside tamper-resistant bait stations.
   b) All applications must be made inside a building or within 100 feet of a building or a man-made structure.
   c) Perimeter baiting can be used along a fence line further than 100 feet from a building as long as bait stations are used.

6) Which of the following is not a good strategy when installing bait stations?
   a) bait stations can be placed around a perimeter of a facility to intercept rodents before they enter
   b) bait stations can be placed randomly throughout a structure
   c) bait stations can be placed along rodent travel paths in existing infestations

7) Bait stations are most effective when placed:
   a) in corners and against walls
   b) on top of equipment and boxes
   c) equidistant throughout a room

8) What is the main reason technicians should brush out their stations at each service visit?
   a) to avoid insecticide contamination
   b) to determine rodent activity
   c) to attract rodents

9) The bait station service record should be filled out quarterly.
   a) true
   b) false

10) On average, a rodenticide block or loose bait will remain palatable to rodents for about 6 months.
   a) true
   b) false

2.13 CALIBRATION

1) What is the main purpose of calibrating pesticide application equipment?
   a) to support the warranty
   b) to insure that the correct volume of material is applied
   c) to prevent leaks and damage
   d) all of the above

2) What can be the result of poorly calibrated pesticide application equipment?
   a) too much pesticide can been applied, which is illegal as well as expensive
   b) too little pesticide can be applied, which can mean a control failure
   c) application volumes can be erratic
   d) all of the above

3) Which statement is not true about flow meters on spray equipment?
   a) a flow meter can get knocked out of adjustment
   b) flow meters avoid the requirement for regular calibration
   c) a flow meter can be affected by temperature and pump pressure

4) How can you check the accuracy of a power sprayer, such as a termite rig, equipped with a flow meter?
   a) fill a bucket to a predetermined one-gallon mark and see if the meter agrees
   b) push the calibration button and reapply for at least one minute
   c) you cannot, the meter has to be serviced

5) What is the simplest way to calibrate a sprayer that is not equipped with a flow meter?
   a) compare it with another sprayer that is equipped with a flow meter
   b) measure the number of seconds it takes to pump one gallon into a marked bucket
   c) calculate the total time to pump your tank empty

6) The “seconds per gallon” figure may be different for each tip or application tool that you use.
   a) true
   b) false

7) A rotary granular spreader with a swath width of 6 feet and with 1/2 pound of granules is empty after being pushed 42 feet at setting “d.” Approximately how many pounds of these granules per 1,000 square feet will the spreader apply?
   a) 0.5 pounds
   b) 1 pound
   c) 2 pounds
   d) 4 pounds

answers

Chapter 2

PESTICIDE APPLICATION TECHNIQUES & EQUIPMENT

2.1 INTEGRATED PEST MANAGEMENT

1. Answer b) is correct. This is a true statement because integrated pest management reduces total dependence on the use of pesticides as a first choice.

   Answer a) is incorrect because doing preventative insecticide applications is not consistent with IPM philosophy. Answer c) is incorrect because merely putting out bait stations does not incorporate the steps of IPM.

2.2 INSECTICIDE BAIT APPLICATION

1. Answer a) is correct. Granular baits are easily applied by hand or with a spreader around foundation perimeters or in yards. They fall through vegetation rather than sticking to it and can cover a broad area in one application.

   Answer b) is incorrect because paste baits are applied mostly to cracks and crevices and bait in these sites will not adequately control most outdoor pests. Paste baits do not weather well outdoors in exposed areas. Answer c) is incorrect because gel baits also have limited application sites and do not tolerate outdoor exposure well.

2. Answer b) is correct. Cockroaches hide in protected sites and cracks and crevices. They like tight spaces like the narrow gap between a kitchen cabinet and a wall, especially when food and water are nearby.

   Answer a) is incorrect because cockroaches usually do not move along baseboards and because a gel application here would be difficult, unsightly, and would be exposed to people, cleaning, dust, etc. Answer c) is incorrect because gel bait should never be applied inside a stove because heat can cause the gel to drip and run and it could contaminate foods or pots and pans.

3. Answer b) is correct. This statement is false because gel baits tend to be specific for certain pests. The food base in the bait is formulated to be attractive to a specific pest and usually will be ignored by other unrelated pests.

4. Answer c) is correct. Gel bait should be reapplied when needed based on a visual inspection of the bait remaining, taking into consideration the pest level, and estimating the amount of bait that may be eaten before the next service visit. Dust and moisture may also affect the lifetime of the bait.

   Answer a) is incorrect because gel bait should not be routinely and frequently reapplied if there is little or no pest activity. Excessive applications are sloppy. Answer b) is incorrect also because the gel may need to be reapplied more often than quarterly if pest activity is high and the bait is depleted. It may need to be applied less often if activity is low. In good conditions, most gel baits will remain effective for many months.

5. Answer b) is correct. More small applications of bait are preferred for German cockroaches. This makes more bait more accessible in more areas for foraging cockroaches.

   Answer a) is incorrect because fewer large applications are less likely to be found by the cockroaches. Answer c) is incorrect because granular baits are not generally used indoors for German cockroaches. Their use is limited to certain inaccessible areas away from food surfaces.

6. Answer c) is correct. This is the false statement because gel baits have relatively low toxicity to people, pets, and other nontargets.

   Answer a) is true because gel baits will dry out eventually depending on how exposed they are to air currents, heat, and sunlight. Answer b) is true because gel baits are slow-acting compared to most other pesticides. This is desirable because you want cockroaches, ants, and other pests to be able to feed on the baits, then recruit others to feed on the baits, or pass the bait on to others back in the colony.

7. Answer b) is correct. The feeding preferences of ant colonies tend to change for various reasons such as the time of year, colony stress, or colony age. Sometimes they prefer protein-based foods and other times they prefer sugar-based foods.

   Answer a) is incorrect because all members of the colony feed on the same foods. Worker ants bring the food back to the nest where they feed the young. Answer c) is incorrect because any insecticide resistance that might develop would not be because of the food in the bait but would be a response to the active ingredient in the bait.

8. Answer c) is correct. Baits have no airborne volatility and no solvent carriers so there is little or no odor when they are applied and no odor remaining after application. Answer a) is incorrect because a baiting job, done correctly, may take more time than a spray treatment. However, it should last longer.

   Answer b) is incorrect because baits, depending on where they are applied, can be removed during cleaning. This is one reason why baits should be placed in out-of-the-way sites where cockroaches are hiding rather than in areas that are frequently cleaned.

9. Answer a) is correct. Some baits can stain some surfaces, especially if the surfaces are light-colored or porous.

   Answer b) is incorrect because baits do not become airborne and contain no solvents. Answer c) is incorrect because there are no solvents, so baits are not repellent to pests.

10. Answer b) is correct because it is false that liquid insecticide baits are often used against cockroaches. Cockroach baits are typically gels, pastes, bait stations, or granulars. Answer a) is wrong because liquid baits are often used against ants and answer c) is wrong because liquid baits are typically used inside bait stations.

2.3 RODENTICIDE BAIT APPLICATION

1. Answer a) is correct. A mouse's home range is usually no more than 20 to 30 feet from its nest, in any direction. If food is plentiful, a mouse will often travel no more than 10 feet from its nest.
   Answer b) is incorrect because a mouse would not nest this far away from a food source. Answer c) is incorrect for the same reason.

2. Answer c) is correct. A rat has a much larger home range than a mouse and will commonly travel more than 100 feet from its nest to find food.

   Answer a) is incorrect because, while a rat may have a food source this close to its nest, it is easily capable of traveling much further to locate food. Answer b) is incorrect because, again, a rat's territory is usually much larger.

3. Answer c) is correct. This is the false statement because the foraging range of mice is rarely more than 30 feet which wouldn't allow them to move from one building to another across a street.

   Answer a) is true because mice require many baiting sites. They are nibblers who feed on only a small amount of food in any one location. Answer b) is true because successful baiting for mice requires bait placements spaced 10 feet apart or less.

4. Answer a) is correct. This is the true statement because a rat can travel up to 150 feet from its nest to find food. This foraging can be in any direction, up into a tree or down into a sewer.

   Answer b) is not true because, typically, bait placements for rats are spaced every 25 to 50 feet. Answer c) is not true because rats are neophobic or very cautious about anything new in their territory. They will avoid new objects for some time.

5. Answer b) is correct. Unlike rats, mice are curious. They have to investigate any changes or new objects in their territory. This means they are more apt to discover your bait if you move objects or bait stations to new locations periodically.

   Answer a) is incorrect because rats are not nibblers like mice. They tend to eat larger amounts at fewer baiting locations. Answer c) is not correct because rats do not like to have their environment disturbed. Unlike mice, they are nervous and will avoid investigating changes in their territory.

6. Answer c) is correct. This is the false statement because rats and mice live and travel in three dimensions and so can be found in suspended ceilings or attics, as well as in crawlspaces.

   Answer a) is true because rats will feed on large amounts of a preferred food in a single location. Answer b) is true because limiting the foods or garbage that rodents are feeding on at a site will force them to feed on your baits instead.

2.4 CRACK & CREVICE APPLICATION

1. Answer a) is correct. A crack & crevice application places small amounts of pesticide directly into areas where pests hide while keeping pesticide away from surfaces, people, and pets.

   Answer b) is incorrect because a baseboard is not a crack, crevice, or inaccessible void. A baseboard spray would be considered a spot treatment and does not meet the criteria for a crack & crevice application. Answer c) is incorrect because the underside of a kitchen shelf is also an exposed area, not a crack or crevice, and treatment here would result in larger amounts of pesticide on an exposed surface.

2. Answer b) is correct. Cockroaches hide in cracks and crevices most of the time. A crack & crevice application places the pesticide into the sites where cockroaches live and is the best type of treatment to control them.

   Answer a) is incorrect because fleas are typically not found in cracks and crevices but instead are found in carpets, upholstery, pet beds, and areas where pets rest. A broadcast treatment is usually used to control fleas. Answer c) is incorrect because most spiders are not found in cracks and crevices. They and their webs are usually out in the open where they can catch prey.

3. Answer b) is correct. This statement is not true because crack & crevice treatment, when done properly, can take longer than a traditional spray application since the technician is making many individual applications into many sites.

   Answer a) is true because a crack & crevice application is targeted to areas where pests are found, rather than to a large, general area. Answer c) is true because a proper crack & crevice application places pesticide into areas that are accessible to pests, but are not easily reached by people or pets. Surfaces are not contaminated by pesticides.

4. Answer a) is correct. Pesticides last longer in crack & crevice treatment sites because they are protected from disturbance, moisture, dust, and grease.

   Answer b) is incorrect because pesticides applied as crack & crevice are protected. Pesticides that are applied in open sites lose their efficiency faster. Answer c) is incorrect because there is definitely a difference in the residual life of a pesticide that depends largely on the site where it is applied.

5. Answer a) is correct. This statement is true because certain crack & crevice pesticides can be used as "flushing agents." When injected into insects' hiding places, they force the insects out into the open.

6. Answer b) is correct. Some pesticide products are packaged with a crack & crevice tip. There are also crack & crevice tips for compressed air sprayers. These specialty tips allow application of the pesticide into narrow spaces where pests hide.

   Answer a) is incorrect because a pin stream nozzle will not apply pesticides deep inside the crack and it will apply significant residues onto surrounding surfaces.. Answer c) is incorrect because a high pressure application would result in splashback of pesticide when trying to place the pesticide into the appropriate sites.

2.5 VOID APPLICATION

1. Answer a) is correct. A void application is a pesticide treatment in a hollow, enclosed space. The space may be as large as a suspended ceiling or as small as a hollow table leg.
   Answer b) is incorrect because a kitchen cabinet is not an enclosed space once the doors are opened. Answer c) is incorrect because pesticides used for void application are not labeled for use in food products.

2. Answer b) is correct. Void applications are used to control pests that hide, nest, or overwinter in out-of the-way places like wall and ceiling voids. For example, insecticide dusts are injected into walls to control yellowjackets nesting in the void.

   Answer a) is incorrect because stored product pests such as the Indianmeal moth are found inside food packages, not voids. Answer c) is incorrect because ticks are usually found outdoors. When found indoors, they do not occupy voids but instead search for people, pets, or other animals to feed on.

3. Answer a) is correct. This statement is true because void applications are sometimes used to flush pests out of the void for inspection purposes.

4. Answer b) is correct. This is the true statement because voids are usually treated with pesticides using a special, narrow tip that can inject the pesticide into the void space through a small existing or drilled opening. Answer a) is not true because void application decreases the exposure to pesticides since the pesticide is placed where it is not available to people, pets, or surfaces. Answer c) is not true since voids that do not have existing openings can be drilled to provide an injection port.

5. Answer a) is correct. Airborne dusts will drift through a void to better fill the space, reaching pests that may be deeper in the void and leaving residue on more surfaces. Pests in the void will continue to pick up the dust residue on their bodies.

   Answer b) is incorrect because airborne dusts are more likely to drift out of voids through existing openings than are liquids. Answer c) is incorrect because insecticide dusts are not necessarily more toxic than liquid insecticides. It depends on the product's active ingredient and concentration.

6. Answer a) is correct. Pesticides in voids are protected from disturbance, moisture, dust, and grease, and so tend to last longer.

   Answer b) is incorrect because it actually takes a lot of time to properly treat voids in an account. Answer c) is incorrect because high application pressure may cause the pesticide to blow out of the void into nontarget areas.

7. Answer b) is correct. Many wall voids are filled with insulation and cross braces which restrict the flow of insecticides resulting in poor coverage inside the void, and that is a **disadvantage** to void treatments.

   Answer a) is incorrect because pesticides last longer in voids where they are protected from the elements and that is an **advantage** to void treatments. Answer c) is incorrect because many pests occupy void spaces where they are protected from people and predators and have space in which to build nests and that is an **advantage** to void treatments.

2.6 SPOT APPLICATION

1. Answer b) is correct. The Environmental Protection Agency defines a "spot" as a treated area that is no larger than two square feet.

   Answer a) is incorrect because, while a spot application can be made to an area of 1 square foot, the maximum size of the allowed area is 2 square feet. Answer c) is incorrect because a spot application of 3 square feet exceeds the area allowed by EPA.

2. Answer b) is correct. A strip 6 inches wide by 4 feet long is the equivalent of two square feet which is the maximum size of a spot application, according to EPA.

   Answer a) is incorrect because a rectangle 2 feet by 2 feet equals 4 square feet which is a larger area than is allowed. Answer c) is incorrect because a circle 24 inches in diameter equals approximately 3 square feet which is larger than the 2 square feet allowed for a spot application.

3. Answer c) is correct. This is the true statement because EPA allows for spots to occasionally touch each other such as around a door frame.

   Answer a) is not true because (depending on the product label) spot applications may be made in commercial sites, including food areas of food-handling establishments. Answer b) is not true because, according to EPA, spots may not be continuous and may not be applied to a broad area.

4. Answer b) is correct. Treatment of a doorway threshold would be considered a spot application since it would constitute an area of less than two square feet and is an area where pests would likely walk across the insecticide.

   Answer a) is incorrect because treatment of a building perimeter is application to a continuous area which does not meet the EPA definition of a spot treatment. Answer c) is incorrect because treatment of a carpet is application to an area larger than two square feet and is considered a broadcast application instead.

5. Answer a) is correct. This is the true statement because spot treatment is usually applied with a fine fan or coarse fan nozzle and a compressed air sprayer.

   Answer b) is not true because a spot application can also be done with a pressurized aerosol. Answer c) is not true because the most effective treatment for controlling cockroaches is generally considered to be a crack & crevice treatment which places insecticides into the specific sites where cockroaches hide.

6. Answer b) is correct. This is the false statement because EPA's definition of a "spot application" does not allow the spots to be continuous, forming a border.

   Answer a) is true because a spot application does leave residue on surfaces which may not be desirable in sensitive sites. Answer c) is true because not all pesticides are labeled for spot application in food areas.

2.7 DIRECT BROADCAST APPLICATION

1. Answer a) is correct. A direct broadcast application is a pesticide treatment to an entire large surface area such as a carpet or lawn.

   Answer b) is incorrect because a directed space spray is an application not onto a surface but into an airspace around infested materials or equipment. Answer c) is incorrect because direct broadcast applications can legally be used indoors (depending on the product label) to control pests such as fleas.

2. Answer b) is correct. This statement is not true because it can be difficult to control the amount of pesticide applied if spray or spreader swaths do not overlap properly.

   Answer a) is true because a direct broadcast application contacts exposed pests directly resulting in a rapid kill. Answer c) is true because the quick kill of exposed pests prevents migration into new sites.

3. Answer a) is correct. Broadcast application to carpets, flooring, and upholstered furniture is a primary control method for fleas indoors since the larvae are found on such surfaces.

   Answer b) is incorrect because cockroaches to not like being in the open and are better controlled by crack & crevice applications of insecticides. Answer c) is incorrect because treating the surface indoors where flies could land would result in excessive pesticide residues on accessible surfaces. Answer d) is incorrect since certain direct broadcast applications are allowed indoors, depending on the product label.

4. Answer c) is correct. This statement is not true because high pressure is not necessary for good spray coverage, and it increases the risk of drift and nontarget applications.

   Answer a) is true because direct broadcast applications are commonly used to treat around the perimeters of buildings to control occasional invaders such as millipedes and crickets.

   Answer b) is true because there are both liquid and granular products that are labeled to be applied as a direct broadcast.

5. Answer a) is correct. This statement is true because a wide angle flat fan tip and a pressure of about 20 psi is typically used for a direct broadcast application indoors.

   Answer b) is not true because broadcast applications are used to treat large surface areas such as walls or floors. Answer c) is not true because outdoor applications are susceptible to runoff due to the fact that generally a large amount of pesticide is applied to a large area.

6. Answer b) is correct. A perimeter treatment can be made with either liquid or granules to the perimeter of a structure and, when using liquids, to lower building walls.

   Answer a) is incorrect because an indoor treatment to a large surface area is not referred to as a perimeter treatment but as a direct broadcast application. Answer c) is incorrect because a true perimeter treatment is a treated band that surrounds a building's perimeter, and is not a broadcast treatment of two walls.

7. Answer a) is correct. A typical perimeter treatment calls for pesticide application to the exterior building wall from the ground up a few feet, as well as application to a swath of ground from 2 to 10 feet out from the structure, and treatment around doors, windows, and other entry points.

   Answer b) is incorrect because this limited application would not adequately prevent pests from moving into the building. Answer c) is incorrect because pests can enter a building in other areas such as around utility conduits and weep holes in bricks. Simply treating around doors and windows would not offer full protection.

8. Answer b) is correct. A direct broadcast application, whether using granules or liquids, is applied in wide swaths over a large area during a single application, an advantage time-wise.

   Answer a) is incorrect because, while a direct broadcast application does apply a large amount of pesticide, this is not generally considered an advantage. Answer c) is incorrect because when a pesticide degrades there is less residual remaining on surfaces which is a disadvantage, not an advantage.

9. Answer b) is correct. Direct broadcast applications that are made outdoors to areas such as lawns can run off and contaminate nontarget areas such as streams and ponds, one disadvantage to their use.

   Answer a) is incorrect because the fact that a large area can be treated during one service visit is considered an advantage of direct broadcast treatment. Answer c) is incorrect because the fact that the residual in the pesticide will continue to act on pests for some time is an advantage.

2.8 SPACE APPLICATION

1. Answer c) is correct. In a space treatment, insecticide covers all exposed surfaces but does not penetrate into voids or enclosed spaces like cabinets.

   Answer a) is incorrect because the fine aerosol does fill the entire airspace during a space application. Answer b) is incorrect because a space treatment can be applied into an enclosed airspace like a void or closet.

2. Answer c) is correct. Space treatments are applied with specialized fogging or aerosol-generating equipment that can produce a large amount of fine airborne insecticide.

   Answer a) is incorrect because liquid insecticides should never be applied with a duster. Answer b) is incorrect because a compressed air sprayer is not capable of producing an aerosol mist that can fill the entire airspace of a room.

3. Answer b) is correct. Space treatments are typically done with nonresidual insecticides because the purpose is to get quick kill of pests without leaving long-lasting insecticide residuals.

   Answer a) is incorrect because a space treatment leaves insecticide on all surfaces and residual insecticides should be placed in sites where they do not contaminate surfaces or nontargets. Residual insecticides are generally (with a few exceptions) not used as space treatments. Answer c) is incorrect because baits are not applied as a fine aerosol mist.

4. Answer a) is correct. Some insect growth regulators (IGRs) are labeled as space treatments.

5. Answer a) is correct. Space treatments are used most often to control flies and stored product moths. Since the aerosol fills the airspace in a room, it will kill pests that are flying as well as crawling pests that are exposed.

   Answer b) is incorrect because cockroaches remain hidden in cracks and crevices that a space application may not reach. Crack & crevice treatment is better for cockroach control. Answer c) is incorrect because both bed bugs and silverfish also remain hidden in crevices and a space application would probably not penetrate to their hiding places.

6. Answer b) is correct. Since a space application fills the airspace in a room or void with insecticide, you need to know how much product to put into that space. Failure to calculate the volume and apply the proper amount, based on the label, is a violation of the pesticide label and federal law.

   Answer a) is incorrect because if the volume of the space is not calculated, too little insecticide could be applied resulting in ineffective control. Or, too much insecticide could be applied leaving illegal residues. Answer c) is incorrect because very large spaces can be treated effectively as long as the volume of the space is calculated for proper application.

7. Answer a) is correct. To avoid exposing unprotected workers to airborne insecticides, space applications to entire rooms should be made when no other persons are present.

   Answer b) is incorrect because no insecticide product is labeled for space application in an occupied room. Answer c) is incorrect because food-handling surfaces must be cleaned after treatment.

8. Answer c) is correct. The fact that the airborne insecticide does not enter voids, cabinets, closets, or similar closed spaces is a disadvantage of space application since pests hiding in these locations will not be affected.

   Answer a) is incorrect because the ability to treat an entire room in a short period of time is an advantage to space application. Answer b) is incorrect because the ability of space application to provide a quick kill is an advantage, especially when trying to control pests like flies.

9. Answer b) is correct. This is the false statement because in a space application, insecticide falls on all accessible surfaces. Unlike a targeted insecticide application that places insecticide only in areas where pests are found, a space application covers all areas including areas where pests are not found, therefore using more insecticide than needed.

   Answer a) is true because the airborne mist of a space application falls on surfaces but does not easily penetrate closed spaces. Answer c) is true because the insecticide floats in the air and can drift into other rooms or spaces if not closed off.

2.9 COMPRESSED AIR SPRAYERS

1. Answer a) is correct. The on-off valve is one of the basic working parts of a compressed air sprayer. It controls the flow of liquid through the siphon tube, hose, and out the nozzle tip.

   Answer b) is incorrect because the strainer is a filtering device, not considered a basic working part. Answer c) is incorrect because there is no compressor part in a compressed air sprayer.

2. Answer a) is correct. A built-in pressure gauge allows you to pump the sprayer to the correct pressure for the type of application.

   Answer b) is incorrect because the valve allows the liquid in the tank to be forced out through the siphon tube but does not measure tank pressure. Answer c) is incorrect because a strainer prevents foreign material from entering the nozzle but does not measure tank pressure.

3. Answer a) is correct. This statement is true because in order to pump up and pressurize a compressed air sprayer, air is compressed in the air space in the tank. The sprayer should be no more than 3/4 full.

4. Answer a) is correct. Fan spray nozzles are used for spot and broadcast applications because they can apply a broader swath of insecticide to cover larger areas of surface.

   Answer b) is incorrect because fan spray nozzles produce too large a droplet to be considered effective as a space spray.. Answer c) is incorrect because crack and crevice applications should be made with an injector tip.

5. Answer b) is correct. Fan spray nozzles are generally used at 20-40 psi.

   Answer a) is incorrect because 10-20 psi is too low a pressure. Answer c) is incorrect because 50 psi is too high a pressure.

6. Answer a) is correct. Pin stream and injector tips are used for crack and crevice application at a pressure of 20 psi or lower.

   Answer b) is incorrect because 40 psi is too high for a crack & crevice application. Answer c) is incorrect because 50 psi is too high for a crack & crevice application.

7. Answer c) is correct. The strainer in a compressed air sprayer filters out contaminants to keep the spray nozzle from clogging.

   Answer a) is incorrect because the strainer does not release pressure, turning the handle does. Answer b) is incorrect because the strainer does not separate liquids, it keeps out particles.

8. Answer b) is correct. Compressed air sprayers should not require more than weekly cleaning. Maintenance checks should be performed daily however.

   Answer a) is incorrect because daily cleaning is more than is needed in most cases. But sprayers should be flushed at the end of each day. Answer c) is incorrect because sprayers require cleaning more often than once a month.

9. Answer b) is correct. This statement is false because ammonia is corrosive and can damage sprayer parts. Instead, use mild detergent or a tank cleaning product.

10. Answer a) is correct. Inspect a compressed air sprayer each day you plan to use it for damage or excess wear to check valve, plunger cup, and hose, as well as check it for leaks.

    Answer b) is incorrect because a weekly check is simply not often enough to detect maintenance problems. Answer c) is incorrect for the same reason.

11. Answer c) is correct. A worn, damaged, or mispositioned check valve can result in liquid leaking around the sprayer handle.

    Answer a) is incorrect because a problem with the pump cup results in an inability to pressurize the tank, not a leak. Answer b) is incorrect because a damaged siphon tube results in air coming out of the nozzle, not a leak.

12. Answer a) is correct. A clogged strainer will restrict the flow of liquid resulting in reduces pressure and dribbling.

    Answer b) is incorrect because a clogged or worn out nozzle will result in an uneven spray pattern. Answer c) is incorrect because a pump cup problem results in no pressure.

13. Answer b) is correct. A pump cup failure results in no pressure in the tank no matter how hard you pump.

    Answer a) is incorrect because a clogged or worn out nozzle will result in an uneven spray pattern. Answer c) is incorrect because a broken or pitted siphon tube result in air but no spray coming out of the nozzle when the spray tank contains liquid.

14. Answer b) is correct. A broken or pitted siphon tube result in air but no spray coming out of the nozzle when the spray tank contains liquid.

    Answer a) is incorrect because a pump cup failure results in no pressure in the tank no matter how hard you pump. Answer c) is incorrect because a worn, damaged, or mispositioned check valve can result in liquid leaking around the sprayer handle.

15. Answer b) is correct. A nozzle that is clogged or worn out can result in an uneven spray pattern even though pressure is good.

    Answer a) is incorrect because a clogged strainer results in spray dribbling out or coming out at low pressure. Answer c) is incorrect because a damaged siphon tube results in air coming out of the nozzle, but no spray.

2.10 POWER SPRAYERS

1. Answer a) is correct. Power sprayers can apply far more pesticide in a given time than can hand sprayers. For this reason, they are used for perimeter treatments, termite control, and lawn treatments.

   Answer b) is incorrect because long hoses do not really provide access to any site, and having to drag hoses around inside is actually a disadvantage when compared to a portable sprayer. Answer c) is incorrect because high pressure can be a disadvantage causing leaks, drifts, and other problems.

2. Answer d) is correct. Answers a), b), and c) are all disadvantages to power sprayers.

   Answer a) High pressure, increases the risk of leaks and spills because it adds stress to fittings and hoses, b) it increases the chance of airborne residues from splashback and smaller particle size (generated by higher pressure), and c) it increase drift because the increased airborne residues with smaller droplet size means that significant residues will stay airborne longer and drift farther.

3. Answer c) is correct. The operator should work through an inspection checklist of the power sprayer before each job.

   Answer a) is incorrect because an operator may perform several jobs in a given day. The sprayer should be checked again before each job, not just at the beginning of the day. Answer b) is incorrect because a weekly inspection is not nearly often enough to spot and intercept problems when a power sprayer is being used regularly.

4. Answer b) is correct. You should start up a power sprayer and let it run for a few minutes so you can check for leaks and make sure the equipment is operating properly.

   Answer a) is incorrect because, while an engine should always be permitted to warm up, checking for leaks is the more important safety concern. Answer c) is incorrect because the pressure should build up almost immediately with a properly operating pump.

5. Answer a) is correct. A gasoline-operated power sprayer will generate dangerous levels of carbon monoxide and other gasses when run in an enclosed area.

   Answer b) is incorrect because, even though it could damage the customer's property, the real issue the potential injury or death from the trapped carbon monoxide and other gasses. Answer c) is incorrect again because the noise risk is secondary to the potential injury or death from the trapped carbon monoxide and other gasses.

6. Answer c) is correct. The discharge line of a high pressure pump can have enough pressure to whip around and cause injury or damage, much like a fire hose.

   Answer a) is incorrect because securing the discharge line would have no effect on back pressure or the pump. Answer b) is incorrect because whether or not the discharge line is secured has no effect on the application rate.

7. Answer a) is correct. A nonflammable spray can reach a concentration high enough to extinguish pilot lights, thus preventing the gas from igniting later when the equipment begins to operate.

   Answer b) is incorrect because many sprays are not flammable. Answer c) is incorrect because corrosion is not an issue with the insecticides that might be used to power spray indoors in attics, crawls, or similar sites.

2.11 DUSTERS

1. Answer c) is correct. The duster should be filled only half full with dust so that the empty space in the duster will allow air to mix with the dust to give a fine application.

   Answer a) is incorrect because a duster should be squeezed only lightly, not hard. Answer b) is incorrect because a duster should always be used with the base of the spout above the level of the dust, never upside down.

2. Answer a) is correct. The screen inside a duster helps prevent the pesticide dust from clumping, assuring a fine, even application of dust.

   Answer b) is incorrect because the screen should never be removed from the duster (unless the pesticide label says to). Answer c) is incorrect because the screen serves no function in preventing contamination of dust inside the duster.

3. Answer c) is correct. A hand-held duster should be shaken lightly before each application to mix the dust and air inside and to keep clumps from forming.

   Answer a) is incorrect because squeezing the duster firmly will apply too much dust rather than mixing dust and air inside the duster. Answer b) is incorrect because turning the duster upside down will apply clumps of dust since the dust can't mix with air.

4. Answer c) is correct. Replacement of the screen is not a valid reason to add ball bearings, marbles, or coins to a duster. The screen should never be removed from a duster (unless the label says to) since it prevents clumping of the dust.

   Answer a) is a valid reason because adding ball bearings, marbles, or coins does give the dust an electrostatic charge which helps it stick to surfaces. Answer b) is a valid reason because adding ball bearings, marbles, or coins helps to shake up the dust inside.

5. Answer a) is correct. During application, a hand duster should be held with the base of the spout above the level of the dust for a proper, even application.

   Answer b) is incorrect because if the dust covers the base of the spout, the dust cannot mix with the air in the duster and clumps will be applied. Answer c) is incorrect because the objective is to apply a light film of dust, not a large amount.

6. Answer c) is correct. When dust is applied as a very fine film, insects will walk through it and get it on their feet and bodies. Heavy applications of dust can repel insects and they will avoid it or and walk around it.

   Answer a) is incorrect because a light film of dust is the desired application. Answer b) is incorrect because insecticide dusts should not be applied, in any case, where they are obvious to the customer. Dusts should be applied in cracks and crevices.

7. Answer a) is correct. A hand-held duster should usually be squeezed lightly to apply a thin film of dust. When squeezed properly you should just barely be able to see the dust come out of the tip.

   Answer b) is incorrect because the intention is not to apply a large amount of dust in any location. Answer c) is incorrect because you do not want to suck dust (and often moisture) back into the duster.

8. Answer a) is correct. This statement is true because you should pull the nozzle away from the opening before relaxing your squeeze so that you do not suck air and moisture back into the duster.

9. Answer a) is correct. A damp cloth may be used to wipe up excessive dust on surfaces.

   Answer b) is incorrect because a damp cloth is not the best tool. Answer c) is incorrect as additional grip is not necessary.

10. Answer b) is correct. This statement is not true because turning on air circulation equipment while dusting could blow the dust or suck the dust out of the treated area into other rooms. Instead, make sure to turn off air circulation equipment during treatment.

    Answer a) is true because rodenticide tracking powders have more restrictive uses. You could contaminate the insecticide dust and apply tracking powder residues in illegal locations. Answer c) is true because, although dusters should normally be squeezed lightly to apply a thin film of dust, more pressure is needed in larger cracks to get a thin film onto all surfaces.

11. Answer a) is correct. Using a lower pressure when treating in small void spaces will reduce the chances of the dust drifting out of openings into nontarget areas such as neighboring rooms.

    Answer b) is incorrect because high pressure can blow the dust right out of the void into other nontreatment sites. Answer c) is incorrect because you never want to treat to the point where dust drifts out of the intended treatment site.

2.12 RODENT BAIT STATIONS

1. Answer c) is correct. The capture of dead and dying rodents is not a reason to use rodent bait stations. To hold rodents for disposal, it's better to use snap traps or glue boards rather than a bait station.

   Answer a) is incorrect because reducing the pesticide risk to children, pets, and other animals is a primary reason for using rodenticide bait stations. Answer b) is incorrect because keeping baits dry and fresh is a primary reason for using rodenticide bait stations.

2. Answer b) is correct. In public areas and sensitive accounts, placing snap traps and glue boards inside a bait station will shield the captured rodents from view. Placing the traps inside a bait station also reduces the chances that they will be sprung or moved by people.

   Answer a) is incorrect because there are at least two good reasons to place snap traps and glue boards inside rodent bait stations. Answer c) is incorrect because placing traps inside bait stations will actually make servicing them more time-consuming.

3. Answer b) is correct. Rodenticide labels require that rodenticides be placed in inaccessible sites or in tamper-resistant bait stations if children, pets, or other nontarget animals could reach the bait.

   Answer a) is incorrect because tamper-resistant bait stations would not be required according to the label in a location where there was no risk that children or animals could get to the bait (although you might want to use them anyway for an added safety factor). Answer c) is incorrect because there may be sites within residential areas, such as in burrows or inside sewers, where tamper-resistant bait stations would not be required since there is no risk that children or animals could get to the bait.

4. Answer c) is correct. Even if rodenticide bait is placed inside a tamper-resistant bait station, children or animals could lift or move the station and shake the bait out, presenting a poisoning possibility. To prevent that, the station must be anchored or wired in some manner so that it can't be lifted.

   Answer a) is incorrect because block baits and water baits could still be shaken or dumped out of a tamper-resistant bait station if it can be lifted. Answer b) is incorrect because, while this is an option, baits can be used in the station if the station is properly immobilized.

5. Answer c) is correct because perimeter baiting can only be done within 100 feet of a building or other manmade structure and a fence is not considered a manmade structure. Answer a) is incorrect because it is true that outdoor above-ground applications must be made inside tamper-resistant stations. Answer b) is incorrect because it is true that all applications must be made inside a building or within 100 feet of a building or a man-made structure.
6. Answer b) is correct. Placing bait stations randomly within a facility is not a good strategy because rodents travel along well-established routes from one point to another, not in a random fashion across open areas.

   Answer a) is incorrect because it is a good strategy to install bait stations around the outdoor perimeter of a building. Rodents travel along the edge of the building and can be intercepted by the bait before they can get inside. Answer c) is incorrect because it is a good strategy to place bait stations along the travel paths of rodents where they will discover them on their regular route.

7. Answer a) is correct. Rodents travel mostly along edges of walls and objects. They particularly like the protection of corners. Bait stations should be placed in these rodent runways to be most effective.

   Answer b) is incorrect because, in most cases and for most rodents, bait stations should be placed at floor level, beneath and between boxes, equipment, and furniture along rodent runways. Answer c) is incorrect because bait stations should be placed along rodent runways, usually along edges of a room rather than spaced evenly throughout the entire floor space of a room.

8. Answer b) is correct. Brushing out bait stations during the service visit will tell the technician if there is new rodent activity at the next service visit. New droppings at the next visit means the station is still active and may even tell what kind of rodents and how many are visiting the station.

   Answer a) is incorrect because cleaning the station does not avoid insecticide contamination. Insecticide contamination of baits occurs when baits are mishandled before placement or when they are stored near other pesticides. Answer c) is incorrect because rodents are not necessarily attracted to a clean bait station. They prefer a station that smells of other rodents so it is best to simply brush debris out of the station; don't wash it.

9. Answer b) is correct. This statement is false because the service record for each bait station should be filled out on each service visit at the time you check the station, not quarterly.

10. Answer b) is correct. This statement is false because block baits and loose baits begin losing their palatability to rodents after about two months. Rodents may stop feeding on the baits sooner if they become dusty or moldy.

2.13 CALIBRATION

1. Answer b) is correct. Most pesticide application equipment gets out of adjustment with use and requires regular calibration to insure that the correct volume of pesticide is applied.

   Answer a) is incorrect because the manufacturer's warranty is not tied to proper calibration of the equipment. Answer c) is incorrect because calibration of equipment will not prevent leaks and damage. Regular maintenance checks and repairs prevent leaks and damage.

2. Answer d) is correct since a), b), and c) can all result from poorly calibrated equipment.

   Poorly calibrated equipment can cause a) overdosage, which is illegal and expensive, or b) underdosage, which can result in control failures, or c) erratic output, sometimes high, sometimes low.

3. Answer b) is correct because it is **not** true. Flow meters also get out of adjustment with use and so require periodic checking and recalibration.

   Answer a) is incorrect because the statement is true, a flow meter can get knocked out of adjustment. Answer c) is incorrect because the statement is true, a flow meter can be affected by temperature and pressure.

4. Answer a) is correct. A simple method to check the accuracy of a flow meter is to fill a bucket to a predetermined one-gallon mark and see if the meter agrees.

   Answer b) is incorrect because, while some meters have internal calibration checks, the true way to check output is to physically measure output. Answer c) is incorrect because meters can be checked for accuracy by the bucket method, although the may have to be serviced if significantly out of adjustment.

5. Answer b) is correct. A simple method to check the accuracy of a flow meter is to fill a bucket to a predetermined one-gallon mark while counting the seconds it takes to do so.

   Answer a) is incorrect because one sprayer's application rate has no relation to another's. Answer c) is incorrect because spraying out the tank certainly defeats the purpose of calibration, which is to make sure beforehand that the dosage is accurate.

6. Answer a) is correct. This statement is true because each spray tip or application tool may have a different flow rate. The flow rate may also change if you change the pressure significantly.

7. Answer c) is correct. The calculation is as follows: the area covered by 0.5 pound of granules equals the length of the swath (42 feet) by the width (6 feet) for a total of 252 square feet, rounded to 250 square feet for simplicity. To determine how many pounds would treat 1,000 square feet, divide 1,000 by 250 to get 4, and then multiply by 0.5 pound, which equals 2 pounds.

   In other words, you would need four times as many granules, or two pounds worth, to treat 1,000 square feet (4 x 0.5 = 2 pounds) as it took you to treat 250 square feet (0.5 pounds).

   83 feet x 6 feet = 498 square feet.

study guide

Chapter 3

PESTICIDES

3.1 INTEGRATED PEST MANAGEMENT

1) The use of indiscriminate pesticide applications is strongly discouraged in Integrated Pest Management. Instead, technicians should:
   a) go through the steps of IPM in each account.
   b) read, understand and follow the label.
   c) be aware of the characteristics of each pesticide, if a pesticide is used.

3.2 TOXICITY AND HAZARD OF PESTICIDES

1) A pesticide is any chemical that is used to manage pests.
   a) A pesticide may be called an insecticide, or a rodenticide, or a herbicide, depending on the target pest.
   b) Not all pesticides kill pests: some repel pests (repellents), some attract pests (attractants), and some affect the growth of pests (growth regulators).

2) Pesticides are important tools for managing pest problems and have significant benefits to our quality of life.

3) Toxicity is the degree to which a chemical is poisonous.
   a) It is a physical characteristic of a material just like its boiling point.
   b) The more toxic a chemical is, the less of it is required to do damage.

4) Every pesticide is toxic to some degree and poses some risk to people and the environment.
   a) The risk can range from negligible to severe, depending on the toxicity of the pesticide and the degree of exposure.
   b) People exposed to excessive levels of a pesticide may suffer short-term or long-term health effects.
   c) Children are especially susceptible to certain pesticides.
   d) Pesticides in the environment can damage nontarget plants and animals, contaminate water, cause fish kills, etc.

5) The potential **hazard** from a pesticide is a function of both the toxicity of the pesticide and the risk of exposure.
   a) The potential hazard to occupants of a room of an insecticide applied into a hidden void is much less than the hazard of the same product when applied as a fan spray to an accessible surface.
   b) The potential hazard to children and pets of a rodenticide secured inside a tamper-resistant bait station is much less than the same rodenticide applied to the ground.

6) People can be exposed to pesticides in several ways.
   a) Applicators face the greatest risk of exposure, especially during mixing and application.
   b) People can also be exposed by entering treated areas too soon after application, before sprays have dried, dusts have settled out, or airborne residues have disappeared.
   c) People may be exposed to small but continuous doses if they work, live, or play in rooms with pesticide residues on rugs, furniture, food preparation surfaces, etc., or by inhaling volatile residues in the air.
   d) Small children may be exposed by touching, licking, or eating pesticide residues.
   e) Spills caused by accident or carelessness can cause dangerous pesticide exposures.

7) Pesticides can damage the environment if misused.
   a) Runoff of pesticide can contaminate surface water (streams, ponds, estuaries, etc.) or ground water (for drinking or irrigation).
   b) Drift can carry airborne residues into nontarget areas such as a neighbor's property, fish pond, vegetable garden, pet water bowl, play areas, or into a ventilation system.
   c) Misapplication can damage plants and kill nontarget organisms.

8) Two documents supply information on handling and use of a particular pesticide product, on storage and disposal, and on hazards to people and the environment:
   a) Pesticide label.
   b) Safety data sheet or SDS (formerly called the material safety data sheet or SDS).

9) The pesticide label provides instructions telling how to correctly **use** the product.
   a) Where it can be used.
   b) What pests are controlled by the product.
   c) Directions for mixing and application.
   d) It briefly highlights how toxic the pesticide is to people, and discusses ways to reduce risks (precautions).
   e) The label is the law regarding the use of the product and should be read each and every time a pesticide is used.

10) The safety data sheet, called an SDS for short, is a guide to the hazards of a pesticide.
   a) An SDS has some of the same information that you can find on a pesticide label.
   b) But it provides more technical details on (1) identification and ingredients, (2) potential hazards, and (3) safety recommendations.

11) Pesticides are grouped into categories based on how toxic they are to people, animals, and the environment.
   a) Special identifying words — called "signal words" — are printed in large letters on every pesticide label to show how toxic the product is.
   b) The signal words are DANGER, WARNING, and CAUTION.
   c) The signal words refer to the toxicity of the concentrated material inside the original container; if the material is diluted the toxicity will be reduced significantly.

12) Pesticide products labeled DANGER are highly toxic.
   a) If the concentrate was swallowed, as little as a taste to a teaspoonful could kill the average person.
   b) All highly toxic pesticides that are very likely to cause acute illness through oral, dermal, or inhalation exposure, also will carry the word POISON printed in red and the skull and crossbones symbol.
   c) Products that have the signal word DANGER due to skin and eye irritation potential will not carry the word POISON or the skull and crossbones symbol.

13) Pesticide products labeled WARNING are moderately toxic.
   a) They may cause acute illness from oral, dermal, or inhalation exposure, or they are likely to cause moderate skin or eye irritation.
   b) The fatal oral dose for the concentrate is estimated to be between one and three teaspoonfuls.

14) Pesticide products labeled CAUTION are slightly toxic or relatively nontoxic and have only slight potential to cause illness or skin or eye irritation.
   a) The vast majority of pesticides used by pest management professionals in our industry carry caution labels and so are classified as slightly toxic or relatively nontoxic.

15) The toxicity of the end-use product (for example, the spray applied to a surface after being diluted) is often much less than the packaged pesticide product.
    a) Two pesticide products with the same signal word may pose different risks to people in the treated area if, say, one is designed to be used full strength and the other to be mixed with water and diluted to a 1 per cent solution.
b) When choosing between similar effective pesticide products, choose the one whose end-use product (the material that is actually applied) is the least toxic to people, and whose potential risks of exposure is lowest (reminder: hazard = toxicity x exposure).

3.3 TECHNICIAN EXPOSURE TO PESTICIDES

1) Applicators of pesticides typically face the highest risk of exposure to themselves and the highest risk of both short and long-term health effects.

2) The Occupational Safety and Health Administration, commonly called OSHA, has a set of rules called the Hazard Communication Standard that give you the right to information you need to protect yourself from hazardous chemicals, including the pesticides you use.
    a) The purpose of the Hazard Communication Standard is to reduce the incidence of chemically-caused illnesses and injuries in the workplace.
    b) It gives you the right to know the hazards and identities of the chemicals, such as pesticides, that you might be exposed to when working.
    c) It gives you the right to know what protective measures are available to prevent any illness and injury from these hazardous chemicals.

3) OSHA requires that you be informed about certain legal requirements of the Hazard Communication Standard:
    a) A company must have a written list of all hazardous chemicals in the workplace.
    b) You must have ready access to the SDS for each pesticide or chemical that you use.
    c) Containers of hazardous materials must be labeled, tagged, or marked with the identity of the chemical and appropriate hazard warnings.
    d) If a chemical is transferred to another container, the new container must be labeled.
    e) You must be provided information and training prior to working with any hazardous material.
    f) Every company must have a Hazard Communication Program in writing.

4) Pesticide exposure can occur through the skin (dermal), mouth (oral), lungs (inhalation), or through the eyes.

5) Ninety-seven percent of all pesticide exposure during spraying is by contact with the skin.
    a) Emulsifiable concentrates and oil-based sprays are the most absorptive through skin.
    b) Dusts and granules are the least absorptive.
    c) Water-based sprays such as wettable powders are somewhere in the middle.
    d) Health risks from skin exposure are higher when skin is exposed to a pesticide concentrate rather than a dilution.

6) The area of the body exposed and the condition of the skin will make a difference in the amount of pesticide absorbed.
    a) The genital area, the scalp, ear canal and forehead absorb pesticide very rapidly.
    b) Cuts, scrapes, and skin rashes absorb pesticide more quickly than unbroken skin.
    c) Hot, sweaty skin also absorbs more pesticide than cool, dry skin.

7) Skin exposure is caused by poor pesticide safety practices, such as:
    a) Splashing, dripping, or spraying pesticides on unprotected skin.
    b) Wearing inadequate personal protective equipment or wearing clothing, gloves, or shoes that are already contaminated with pesticide.
    c) Applying pesticides outdoors in windy weather.
    d) Touching pesticide-treated surfaces.
    e) Not washing hands after handling pesticides or pesticide containers.

8) Before handling a pesticide, check for a Precautionary Statement on the label that will alert you to the need for skin protection:
    a) “Harmful if absorbed through skin.”
    b) “May be a skin sensitizer.”
    c) The label may specify the use of gloves and wearing long sleeves, in addition to other precautions.

9) Skin exposure can cause a number of different symptoms and effects.
   a) Contact with some pesticides can cause your skin to itch, blister, crack, or change color.
   b) Extreme skin exposure, particularly to concentrates, can progress to nausea, cramps, sweating, difficulty breathing and other more serious symptoms.
   c) Continued skin exposure to some pesticides over a period of time can cause delayed health effects.
   d) Some pyrethroids may cause a mild and temporary skin sensitization or allergic skin reaction in some individuals.

10) Follow label directions for first aid for skin (dermal) exposure. If label directions are unavailable, do the following:
   a) Immediately drench the skin and clothing with plenty of cool water.
   b) Remove contaminated clothing and equipment.
   c) Wash exposed skin and hair with soap and water.
   d) Cover any chemical burns with clean cloths or bandages. Don't apply any first aid ointments.
   e) For burns or after exposure to highly toxic concentrates, see a physician and bring the pesticide label and SDS.
   f) Also see a physician if any symptoms persist.

11) Oral exposure can occur in any of the following ways:
   a) Not washing your hands before eating, drinking, smoking, or chewing.
   b) Accidentally splashing pesticide in your mouth when pouring or applying it.
   c) Accidentally applying pesticide to food, cigarettes, or other objects that then go into your mouth.
   d) Wiping your mouth with a contaminated hand.
   e) Mistaking pesticide for food or drink.

12) Before using a pesticide, look for a Precautionary Statement on the label that will alert you to the degree of oral hazard.
   a) "May be harmful if swallowed" for a pesticide with a slight oral toxicity.
   b) "Fatal if swallowed" or "Can kill you if swallowed" for a highly toxic pesticide.

13) Symptoms of oral exposure to a pesticide vary depending on the product.
   a) Oral exposure to certain pesticides can burn your mouth or throat and make it difficult to swallow.
   b) Some pesticides can burn your digestive system.
   c) Some can be carried through your blood stream and cause various chronic or delayed health effects.
   d) For some restricted-use pesticides, swallowing even a few drops from a splash or wiping your mouth with a contaminated glove can make you very ill.

14) First aid procedures for oral pesticide poisoning are not the same for all types of pesticides so follow the pesticide label's first aid section carefully. If the label is not available:
   a) Rinse mouth with plenty of water.
   b) Drink large amounts (up to 1 quart) of milk or water.
   c) Induce vomiting only if the pesticide label, manufacturer, or poison control expert advises you to do so.
   d) In general, vomiting should not be induced if the victim is having convulsions, or if the victim has swallowed an emulsifiable concentrate or oil solution, or a strong acid or alkali poison.
   e) Get to a physician as soon as possible.

15) You can be poisoned by inhaling too much of any airborne pesticide: aerosols, liquid sprays, fumigant gases, or dusts.
   a) Inhalation can be a hazard if you are working in a poorly-ventilated, enclosed space like a crawlspace, attic, or manhole.
   b) Fumigators need to be especially careful to avoid inhaling a fumigant which can be fatal.

16) Inhalation exposure can be caused by any of the following mistakes:
   a) Failing to use the proper respirator when necessary.
   b) Using a respirator that doesn't fit properly or using old or inadequate filters, cartridges, or canisters.
   c) Using a pesticide in a closed or poorly-ventilated space and not wearing a respirator.
   d) Spills and improper storage in storage facility or vehicle.
   e) Inhaling vapors or dusts when reentering an area too soon.
   f) Inhaling pesticide drift from a treated area.

17) Before handling a pesticide, look for a Precautionary Statement on the label that will alert you to an inhalation hazard:
    a) "Harmful if inhaled."
    b) "Do not breathe dusts, vapors, or spray mist."
    c) "Inhalation may cause delayed lung, nerve, or brain injury."
    d) The label may specify the use of a specific type or model of respirator.

18) Symptoms of inhalation exposure vary with the product and the degree of exposure.
    a) Some inhaled pesticides may "burn" your respiratory system, making it difficult to breathe.
    b) Some may not affect your breathing at all but may be carried through your blood stream causing other harmful effects.
    c) You may develop flu-like symptoms such as nausea, headache, chills, and aches.
    d) The effects of inhaling a pesticide may result in delayed, or chronic, effects that appear days later.
    e) Continuous or frequent inhalation exposure to some pesticides over a long period of time can result in emphysema or asthma that appears years later.

19) Follow the first aid instructions on the label for overexposure to an inhaled pesticide. First aid might include any of the following:
    a) Get the victim away from the pesticide vapors and into fresh air immediately. (Make sure you are wearing a respirator and other PPE as necessary.)
    b) If other people are in the same area, warn them of the danger.
    c) Loosen any tight clothing.
    d) If the victim has stopped breathing, immediately call 911 (if possible) and administer CPR.
    e) Keep the victim warm and quiet.
    f) Get the victim to a hospital or physician.
    g) Take the pesticide container, label, and SDS with you.

20) The health effects from pesticide exposure to an eye depend on the toxicity of the pesticide, how much pesticide is involved, and how long the pesticide remains in contact with the eye.
    a) The effects can range from simple eye irritation to eye burns to permanent blindness from some highly corrosive pesticides.
    b) Some pesticides may not irritate your eyes at all but can pass through your eyes and enter your body causing internal poisoning.
    c) The eyes offer a very fast route for pesticide absorption.

21) You can get pesticide in your eyes by any of the following mistakes:
    a) Accidentally splashing or spraying pesticides into your eyes.
    b) Applying pesticides in windy conditions without eye protection.
    c) Rubbing your eyes with contaminated gloves or hands.
    d) Having dusts, wettable powders, or granules drift into unprotected eyes.

22) Before handling a pesticide, look for a Precautionary Statement on the label that will alert you to the need for eye protection:
    a) "Avoid contact with eyes."
    b) "May irritate eyes."
    c) "Causes eye burns."
    d) The label may specify the use of a specific type of safety eyewear, such as goggles, at least when pouring or mixing the product.

23) Usually you will know right away if you have gotten pesticide in your eyes.
    a) The acute symptoms that occur immediately may include burning or tearing.
    b) Even if there is no irritation, you must take immediate first aid measures to keep the pesticide from entering your system.

24) Follow the first aid instructions on the label for eye contamination. Most importantly wash the eye or eyes quickly, but gently.
    a) Use an eye wash dispenser if available. Otherwise, use a garden hose or faucet.
    b) Hold the eye open and wash with a gentle flow of water across the eye.
    c) Continue to rinse the affected eye or eyes for at least 15 minutes.
    d) Don't use eye drops afterwards.
    e) Inform your supervisor.
    f) Check with a physician if advised to do so on the label, or if you have any remaining symptoms (irritation, blurred vision, etc.)

25) Certain pesticide formulations present more of a hazard to the applicator than do others.
    a) Aerosols can present an inhalation hazard during application, especially in confined spaces, a risk to eyes from splashback, and the propellants in some pressurized aerosol containers are flammable and must be kept from heat, flame, or puncture.
    b) Baits present little hazard to the applicator.
    c) Dusts present an inhalation hazard when filling equipment and during application, they may irritate eyes, nose, throat, and skin, and there is a potential eye hazard from abrasive particles.
    d) Emulsifiable concentrates are sometimes flammable, skin absorption is faster, as a rule, than with wettable powders or other dry formulations, there is a hazard to eyes from splashback, and the finished mix conducts electricity.
    e) Granules present little hazard to the applicator.
    f) Microencapsulates present a hazard to eyes from splashback, and the finished mix conducts electricity.
    g) Wettable powders present an inhalation hazard during mixing (although water-soluble packets eliminate this risk), the packaging of some wettable powders makes them hard to mix without getting on the skin, and the finished mix conducts electricity.

3.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

1) PPE is short for personal protective equipment. Some PPE is used to protect you from exposure to pesticides.
    a) Examples include chemical-resistant gloves, respirators, even pants and long-sleeved shirts.
    b) The PPE you use will depend on the pesticide product, the application technique, and specific conditions at the site.

2) The pesticide label will provide instructions for the minimum level of protection required when using the product.
    a) You can always choose PPE that provides a larger measure of safety (such as a full-face respirator rather than a standard respirator).
    b) You should always feel free to use more PPE than specified on the label (such as wearing gloves during application even though the label doesn't require them).

3) Respirators have to be worn whenever airborne contaminants may affect your health and safety.
    a) Most pest control technicians wear a respirator at least some of the time such as when mixing or applying pesticides.
    b) OSHA requires that pest control companies have a Respiratory Protective Program in place.

4) Using a respirator stresses your body because breathing is restricted.
    a) How much stress depends on the type of respirator, job conditions, and your health.
    b) Certain medical conditions, such as heart or lung trouble, affect your ability to use a respirator safely.
    c) Other factors that affect your ability to use a respirator safely include beards, dentures, the shape of your face, some types of glasses, and the use of certain medications.

5) Your respirator must be suited to the particular hazards you face, and it must fit properly in order to work.
    a) The first step in respirator training is selection of the proper type and size of respirator for the individual and the job.
    b) Most technicians use a cartridge respirator, but technicians doing fumigation may need a self-contained breathing apparatus (SCBA).
    c) Technicians who wear glasses may need a full facepiece respirator to get an adequate seal.

6) A fit test is necessary to determine if your respirator fits properly.
   a) There are different ways to do a fit test.
   b) Most pest control companies use a simple substance detection test to check the fit (an odor test uses banana oil; a taste test uses saccharin; other tests use a harmless irritant or smoke).
   c) While you wear your selected respirator, the substance is wafted into the air in front of you. If you can smell it, taste it, or otherwise detect it, your respirator doesn't fit properly.
   d) Once you've found a respirator that fits, you must repeat the fit test every year ... or more often if you gain or lose weight or get dentures or glasses.

7) Conduct a "user seal check" to recheck the fit of your respirator each time you wear it.
   a) Seal checks can be positive pressure tests or negative pressure tests.

8) For positive pressure tests, cover the exhalation valve with your hand.
   a) Press lightly and exhale gently.
   b) If the fit is correct, you should feel the facepiece bulge slightly from trapped air.
   c) If air is escaping, recheck and refit.

9) For a negative pressure test, close off the inlet openings by covering them with the palms of your hands, or by replacing the filter seals.
   a) Inhale gently so that the facepiece collapses slightly, and hold your breath for ten seconds.
   b) If the facepiece stays collapsed, and no air is leaking, the fit is correct.

10) All respirators must be inspected for wear and deterioration before and after each use.
   a) Check the facepiece for dirt and grime, cracks, or tears. Make sure the shape of the facepiece is not distorted from improper storage or from deterioration of the material.
   b) Check the headstraps for cracking, loss of elasticity, or broken buckles or attachments.
   c) Remove the cover of the exhalation valve and check for dirt, debris, or hairs under the valve seat and make sure the valve is seated properly in the valve body.
   d) Check the condition of the cartridges.

11) Cartridges and filters gradually lose their protective ability. Their useful life depends on the following:
   a) The amount of particles in the air.
   b) The concentration of vapor being filtered.
   c) The amount of absorbent material that they contain.
   d) The breathing rate of the wearer.
   e) The temperature and humidity.
   f) The length of time that they've been stored between uses.

12) Follow the manufacturer's guidelines on when to replace filters and cartridges.
   a) If there are no guidelines, change cartridges after about 8 hours of use or if you smell pesticides or have trouble breathing.

13) Respirators should be cleaned and disinfected frequently.
   a) If a respirator is shared with another worker, it must be cleaned and disinfected after <u>each</u> use.
   b) Proper cleaning requires disassembly.
   c) Use a mix of detergent, bleach, and warm water, or a commercially-available cleaner and disinfectant solution.
   d) Do not use ammonia, hot water, or strong cleaning detergents or chemicals as they can damage respirator parts.
   e) A respirator that has been contaminated with a concentrated pesticide may require a separate decontamination procedure. In such a case, check with the manufacturer of your respirator.

14) Store respirators where they are protected from dust, sunlight, extreme temperatures, moisture, pesticides, and other chemicals.
   a) Place them in a normal position to prevent distortion of the shape of the rubber or plastic parts.
   b) During the work day, respirators stored in your vehicle should be kept away from pesticides.
   c) Don't throw a respirator into a service kit or locker unless it is protected in a carrying case or box.

15) Many pesticide labels require you to wear chemical-resistant gloves.
   a) A glove is considered "chemical-resistant" if there can be no movement of pesticide through the material during its use.
   b) If you are handling or applying a pesticide product that contains a solvent, choose gloves made of butyl, nitrile, or foil-laminate.
   c) Sometimes the label or SDS will specify what type of gloves are resistant to the pesticide or solvents in the product ("Wear chemical-resistant gloves such as butyl or nitrile").

16) Pest control technicians often need eye protection when using pesticides.
    a) Pesticide can splash into your eyes when pouring, or it can splash back during application.
    b) You may need eye protection from airborne pesticides when applying certain aerosol, dust, or space treatments.
    c) Always check the pesticide label to see what type of safety eyewear is required.

17) There are different types of eye protection equipment and they provide different levels of protection.
    a) Unvented goggles protect your eyes when applying any pesticide.
    b) Vented goggles are less likely to fog, but aerosols and mists may get inside.
    c) Safety glasses must have attached brow and side panels.
    d) Face shields protect your entire face from pesticide splash and can be worn with eyeglasses.
    e) Regular eyeglasses are not considered to be adequate PPE for pesticide use.

18) Clothing is a type of PPE since in some sense and to some degree it keeps pesticide from contacting your skin.
    a) Coveralls worn over regular clothing provide additional protection and can be quickly removed if contaminated.
    b) Other types of clothing are specifically designed to protect against skin exposure to chemicals; a common example is Tyvek®.
    c) Fabric protectants and even spray starch can make clothing more effective in preventing skin contamination from pesticides.

3.5 PROTECTING PEOPLE AND THE ENVIRONMENT FROM PESTICIDES

1) Pesticide misuse, spills, and accidents can affect human health, kill nontarget animals and plants, contaminate surface or ground water, pollute the natural environment, and cause a wide range of impacts ranging from minor to catastrophic.
    a) Check the label's environmental hazards section for special warning statements concerning hazards to the environment.

2) Minimize the risk of exposure to pesticides in the environment by using them judiciously.
    a) Use pesticides to suppress verified pest problems only after consideration of nonchemical control options.
    b) When use of a pesticide is deemed necessary, choose an effective pesticide product and application method posing the least hazard.

3) It is a violation of law to use a pesticide in a manner inconsistent with its labeling.
    a) Always read label instructions before **every** application.
    b) Always follow the label instructions for every application.

4) You must exactly follow all mandatory statements and instructions on a label.
    a) A mandatory statement will contain such key words as "must," "shall," and "will," or it will use an expression such as "do not," "use only," or "for use only by."
    b) Statements containing words like "should," "may," and "it is recommended that" are suggestions only and you may depart from them.

5) Use pesticides only if the site of your application is specified on the pesticide label.

6) Follow proper pesticide application procedures and label instructions to avoid injuring wildlife, pets, livestock and other nontarget organisms.
    a) Take particular care with rodenticides and avicides.
    b) When using rodenticide baits and tracking powders apply them out of the reach of children, pets, and wildlife or inside tamper-resistant bait stations.
    c) Choose formulations of rodent bait that are least susceptible to bait translocation, which is when rodents (or other animals) carry bait out of the treatment site into a new area.
    d) Do not apply an avicide in areas or at times when nonpest birds might be affected.
    e) Secondary poisoning can also occur when nontarget predators or scavengers feed on poisoned rodents or birds.

7) A spill is any accidental release of pesticide.
   a) The spill may be minor, requiring little cleanup effort, or it may be major, involving large amounts of pesticide and serious contamination.
   b) Even a spill that appears minor can endanger you, other people, and the environment, especially if mishandled.
   c) Large leaks or spills require specially trained and equipped emergency crews.

8) The early steps you take to control a spill can reduce or eliminate damage or injury, and the faster you act, the less chance the spill will cause harm.
   a) Carry a spill control kit in your vehicle.
   b) Be sure you know what to do **before** you have a spill.

9) If you have a pesticide spill, be calm and reasoned but work quickly to protect people and the environment.
   a) Try to enlist responsible help.
   b) Remember to protect yourself and others who are working on the spill.
   c) Use personal protective equipment (PPE).

10) Stop the spill.
   a) Turn off the pump, pinch the hose closed, place a leaky container inside a larger container — do whatever you need to do to limit the size of the spill.
   b) Stopping the spill is usually simple, but occasionally is best left to experts; for example, when a spray rig overturns.
   c) Don't take unnecessary risks.

11) Decontaminate and give first aid.
   a) The safety of people in the spill site is your first priority.
   b) Anyone contaminated by the spilled pesticide should remove the contaminated clothing, wash down, and receive first aid as appropriate (check the label for first aid instructions).

12) Contain the spill.
   a) Keep the spill from spreading.
   b) Keep the pesticide from entering storm drains, wells, sewers, streams, and other water systems, or from moving into other occupied areas.
   c) For spills of liquids, create dams and dikes with sand, sorbent snakes, kitty litter, special spill control absorbents or, as a last resort, rags or paper towels.
   d) Outdoors you can trench around the spill area and/or build a dike of soil.
   e) Dry spills (wettable powders, dusts, granules) should be gently covered with a tarpaulin.

13) Isolate the area.
   a) Keep people and pets out of the spill area.
   b) Rope off the area.
   c) Try to draft someone to act as "policeman" while you deal with the spill.

14) Report the spill.
   a) First, call your office for instructions.
   b) Depending on the material spilled, the amount of the spill, and state and federal laws, you or your supervisor may have to contact the fire department, police, certain state and federal agencies, or spill "hotlines."

15) Clean up the spill.
   a) Procedures will depend on the pesticide, the amount of the spill, and the location.
   b) Follow instructions from the office or from a spill hotline.
   c) Do not work alone.
   d) Wear appropriate protective equipment.

16) Decontaminate as necessary. The manufacturer of the pesticide will provide information on how to decontaminate surfaces and materials.

17) Dispose of contaminants.
   a) Recovered pesticide should be saved and used at a job site, if possible.
   b) All contaminated materials (such as absorbents, rags, soil, and wood) must be removed from the site and disposed of as required by law.
   c) Place the material in a sealable, leakproof drum or, if a drum is not available, in double heavy-duty plastic trash bags, until you find out the proper disposal procedure.

18) A leaking pesticide container demands immediate action.
   a) Put on any personal protective equipment, such as rubber gloves or goggles, that is required or suggested on the label.
   b) If the leaking is severe, first contain the leak. A quick way to do this is to temporarily place the container inside a five-gallon plastic bucket.
   c) Transfer the pesticide to another container or into a spray tank or other piece of application equipment.
   d) Clean up any spillage.

19) Ground water can become contaminated with pesticides and decontamination of this water can be difficult or impossible. Contamination can occur when:
    a) Rain carries dissolved pesticide down through the soil (a process called leaching).
    b) Pesticide is back-siphoned from pesticide tanks.
    c) Termiticides enter wells during termite treatment.
    d) Pesticides, particularly concentrates, are not disposed of properly.

20) Protect ground water from contamination by following the label and good application practices:
    a) Assess the risk of ground-water contamination before treatment by checking soil type, looking for wells, cisterns, springs, streams, storm drains, and other potential routes to ground water, and knowing the depth of the ground water in an area.
    b) Choose products least likely to leach (check the label or contact the manufacturer).
    c) Avoid spills and clean up any spills immediately.
    d) Use a backflow preventer and/or air gap when filling spray tanks.
    e) Do not apply outdoor applications if rain is forecast, or if the ground is saturated or frozen.

21) Pesticide applicators are legally responsible for "properly" disposing of their leftover pesticides including all of the following:
    a) Rinse water — solutions used to rinse application equipment and product containers.
    b) Empty containers — containers that retain pesticide residues.
    c) Unused pesticides — old pesticides, unusable, diluted pesticides, or unidentifiable materials.
    d) Contaminated soil — soil or other substrate (carpets, furniture, spill control products) contaminated from spills.

22) Check the label for specific disposal instructions for a particular product.
    a) Instructions will usually be found in a section called "Disposal" or "Storage and Disposal."
    b) Sometimes, however, the disposal instructions may be found under a different heading so be sure to read the entire label.
    c) State rules may sometimes be more specific on methods of disposal so be familiar with them.

23) Many pesticide containers must be "triple-rinsed" before disposal, and the steps are as follows:
    a) Drain the "empty" container into your application equipment for at least 30 seconds.
    b) Fill the container 1/4 full of clean water, replace the cap, and swish the liquid around.
    c) Pour the rinsate into the sprayer and let it drain for 30 seconds.
    d) Repeat these steps twice more.
    e) Use the rinse water in the sprayer according to the product label (as a diluent or end-use dilution).
    f) Puncture or crush the container so it cannot be reused (unless it is being returned to the manufacturer as recyclable).

24) When you clean a sprayer or other application equipment, you cannot just pour the rinse water down the drain.
    a) The rinse water from this cleaning, called "rinsate," contains diluted pesticide.
    b) If you can, handle this rinsate just as you do rinsate from triple-rinsed containers — use it in a sprayer as a diluent or an end-use dilution.
    c) Otherwise, this diluted pesticide must be disposed of as a hazardous material.

25) Drift is the movement of the pesticide away from the site or pest you are treating and into nontarget areas.
    a) Pesticide drift is the responsibility of the applicator and, when it occurs, may be considered a misapplication under FIFRA.

26) Learn how to anticipate and avoid problems with drift.
    a) Drift is most common outdoors with power sprays.
    b) Drift is most likely during outdoor application with wind 10 mph and higher.
    c) Other factors, such as temperature, humidity, and droplet size also contribute to pesticide drift.

27) When treating outdoors, technicians need to check for things that could be contaminated by pesticide drift. Examples include fish ponds, play areas, vegetable gardens, sandboxes, swing sets, intake vents, laundry on the line, lawn furniture, pet water bowls, pet runs, bee hives, vehicles, and streams.

28) When spraying outdoors, take steps to reduce the risk of drift.
    a) Do not spray when wind is blowing toward sensitive areas.
    b) Do not spray when it is windy.
    c) Use the lowest application pressure practicable.
    d) Choose a nozzle that produces a coarse spray.
    e) Use a commercial "drift reduction" (thickening) agent in your tank.

29) Pesticide drift can, on rare occasions, occur even hours or days after an application.
    a) A dried wettable powder residue might be tracked into a restaurant's kitchen on a worker's shoes.
    b) The day after a perimeter treatment of a home, a storm can blow piles of treated leaves into a nearby fish pond.

30) Pesticide drift can happen during indoor applications, as well.
    a) Fans, air conditioners, and blowers create indoor wind that moves pesticide where it is not wanted.
    b) Even void treatment can generate drift if applied under too high a pressure, drifting out of the void through holes, electrical outlets, or vents.

31) When power-spraying in attics, crawlspaces, and other indoor sites, check for air intakes and turn off all ventilation during treatment.

study questions

Chapter 3

PESTICIDES

3.1 INTEGRATED PEST MANAGEMENT

1) If a technician wishes to do a pesticide application using IPM, but the site is not on the label, it will be permitted.
   a) true
   b) false

3.2 TOXICITY AND HAZARD OF PESTICIDES

1) A rodenticide is not actually a pesticide.
   a) true
   b) false

2) Which one of the following statements is true?
   a) children have the same risk from pesticides as adults
   b) people may not notice effects from pesticide exposure until weeks or months later
   c) there are nontoxic pesticides available for sensitive sites

3) Which one of these pesticide applications presents the greatest potential hazard to the occupants of a room, assuming the same pesticide is used in all cases?
   a) pesticide injected into a void space
   b) pesticide applied with a crack & crevice tip
   c) pesticide applied as a fan spray along baseboards

4) Pesticide drift is:
   a) runoff into a nontarget area
   b) airborne residues in a nontarget area
   c) unavoidable when power-spraying

5) Which one of these is **not** information supplied on a pesticide label?
   a) directions for mixing and applying
   b) sites where the product can be applied
   c) contact phone numbers for state regulators

6) Which of these documents is primarily a guide to the hazards of a pesticide?
   a) safety data sheet
   b) pesticide label
   c) service ticket

7) The words DANGER, WARNING, and CAUTION that are found on a pesticide label are called alarm words and refer to the toxicity of the mixed product.
   a) true
   b) false

8) Which one of these words on a pesticide label means that the product is “moderately toxic?”
   a) DANGER
   b) WARNING
   c) CAUTION

9) A pesticide product label that has the word DANGER may also have the word POISON printed in red.
   a) true
   b) false

10) Which one of the following statements is true?
   a) most of the products used by pest management professionals are labeled CAUTION
   b) if two pesticides have the same signal word, they pose the same level of risk to people
   c) some registered pesticides do not have a signal word on the label

11) Which one of the following statements about types of pesticides is true?
   a) not all pesticides kill pests
   b) insect growth regulators are not pesticides
   c) insect attractants are not pesticides

12) The potential hazard from a pesticide is a function of both the toxicity of the pesticide and _____?
   a) its specific gravity
   b) the risk of exposure
   c) the signal word

3.3 TECHNICIAN EXPOSURE TO PESTICIDES

1) Pesticide applicators have the greatest risk from pesticides.
   a) true
   b) false

2) Which one of these is **not** a purpose of the Occupational Safety and Health Administration's Hazard Communication Standard?
   a) to alert you to chemical hazards
   b) to alert you to protective measures
   c) to alert you to proper pesticide application sites

3) The Hazard Communication Standard requires that you be provided information before working with any hazardous material.
   a) true
   b) false

4) Most pesticide exposure happens during spraying and occurs:
   a) by inhalation
   b) by skin contact
   c) through the mouth

5) Which one of these pesticide formulations is the most absorptive through the skin?
   a) emulsifiable concentrate
   b) dust
   c) wettable powder

6) Which one of these situations will cause your skin to absorb pesticide more quickly?
   a) cool skin, instead of hot skin
   b) a spill to your genital area, instead of on your hands
   c) using a dust instead of a wettable powder

7) To find out if you need skin protection when using a certain pesticide, you should check which section of the pesticide label?
   a) Precautionary Statements
   b) Environmental Hazards
   c) Physical and Chemical Hazards

8) If you suffer skin exposure to a pesticide, the first thing you should do is:
   a) check the pesticide label
   b) rinse your skin and clothing
   c) apply skin ointment

9) Which one of these is not an example of oral exposure during pesticide application
   a) wiping your mouth with your hand
   b) smoking a cigarette
   c) breathing in pesticide vapors

10) Which one of these statements found on a pesticide label is a warning of a possible oral poisoning hazard?"
   a) "Do not breathe dusts, vapors, or spray mist
   b) "May be a skin sensitizer"
   c) "May be harmful if swallowed"

11) Oral exposure to certain pesticides can injure your digestive system.
   a) true
   b) false

12) If you accidentally get pesticide in your mouth, the first thing you should do is:
   a) induce vomiting
   b) rinse your mouth with water
   c) check the pesticide label

13) If you are using a respirator as required by the pesticide label, inhalation poisoning is not a hazard.
   a) true
   b) false

14) Which one of these is not a possible cause of inhalation exposure to a pesticide?
   a) reentering an area too soon after a space treatment
   b) spilling a pesticide dust in your vehicle
   c) touching a pesticide-treated surface

15) Inhalation exposure to a pesticide can result in flu-like symptoms.
   a) true
   b) false

16) Which one of these is a first aid procedure for someone suffering from pesticide inhalation exposure?
   a) remove clothing
   b) get the victim away from pesticide vapors
   c) give the victim large amounts of water to drink

17) Which one of these statements is true?
   a) pesticide in the eye results in reversible irritation
   b) eyes absorb pesticide slowly
   c) in some cases, pesticide in the eye causes internal complications elsewhere in the body

18) If you get pesticide in your eye, you should first:
   a) use eye drops
   b) rinse out the eye
   c) wear protective goggles

19) If you get pesticide in your eye, you should rinse out your eye with water for at least 15 minutes.
   a) true
   b) false

20) Which one of these pesticide formulations poses the least amount of risk to a pesticide applicator?
   a) baits
   b) dusts
   c) emulsifiable concentrates

21) The greatest risk to an applicator using an aerosol is getting pesticide on the skin.
   a) true
   b) false

3.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

1) Which one of these is **not** an example of personal protective equipment (PPE)?
   a) prescription eyeglasses
   b) long-sleeved shirt
   c) gloves

2) You must wear the exact PPE that is specified on the pesticide label.
   a) true
   b) false

3) The use of a respirator is most likely to be required in which situation?
   a) applying an aerosol space treatment
   b) applying gel bait
   c) doing a void injection

4) A technician doing fumigation should wear a cartridge respirator.
   a) true
   b) false

5) To make sure that your respirator fits you properly, you should:
   a) check for the smell of pesticide
   b) check in a mirror
   c) conduct a fit test

6) Which one of these statements is true about a "user seal check" of a respirator?
   a) you should do a check weekly
   b) in a positive pressure test, you cover the exhalation valve with your hand
   c) in a negative pressure test, you cover the exhalation valve with your hand

7) You should check your respirator for wear and deterioration before and after each use.
   a) true
   b) false

8) Which is the best criterion for when to replace respirator cartridges?
   a) the manufacturer's guidelines
   b) the smell of pesticide
   c) after 8 hours of use

9) When cleaning your respirator, you should:
   a) use ammonia to disinfect it
   b) clean it after each use if it is shared with another worker
   c) avoid removing the cartridges

10) Before you place your respirator in your service kit, you should put it in a plastic bag.
   a) true
   b) false

11) If a pesticide label requires that you wear a "chemical-resistant" glove during mixing and application, you should choose:
    a) nitrile gloves
    b) disposable vinyl gloves
    c) cotton gloves

12) Which one of these offers the best eye protection if you are applying a pesticide aerosol mist?
    a) safety glasses
    b) vented goggles
    c) unvented goggles

13) Clothing does not qualify as personal protective equipment.
    a) true
    b) false

3.5 PROTECTING PEOPLE AND THE ENVIRONMENT FROM PESTICIDES

1) How do you determine what Environmental Hazards are posed by a particular pesticide product?
    a) from safety training
    b) from the Environmental Hazards section of the label
    c) by asking your supervisor

2) Use pesticides to suppress verified pest problems only after consideration of:
    a) nonchemical control options
    b) cost
    c) mode of action

3) When you need to apply a pesticide, it is **most** important to choose a product and application method that:
    a) has a wide range of pests and sites on the label
    b) is least expensive
    c) poses the least hazard

4) Using a pesticide in a manner "inconsistent" with its labeling:
    a) requires a permit from the state
    b) is illegal
    c) applies to sites of application only

5) You may apply a pesticide to a site not specifically listed on the label as long as the pest is listed.
    a) true
    b) false

6) Rodent bait translocation occurs when:
    a) rodents (or other animals) carry bait out of the treatment site into a new area
    b) a technician moves existing rodent bait into a new location
    c) predators become sick when they feed on animals killed by the bait

7) Rodent bait must be placed inside "tamper-resistant" bait stations whenever:
    a) the bait would be exposed to moisture
    b) the bait is being placed on the ground
    c) the area is accessible to children, pets, and nontarget animals

8) When an animal becomes sick after feeding on a poisoned rodent or bird, it is called:
    a) primary poisoning
    b) secondary poisoning
    c) secondary hazard

9) If a pesticide is spilled, the first step is to assess the size of the spill so you can determine if it must be cleaned up.
    a) true
    b) false

10) Which statement is true in regards to a pesticide spill?
    a) wear personal protective equipment (PPE) if there is time to put it on
    b) immediately call the office for a spill control kit
    c) the faster you act, the less chance a spill will cause harm

11) Your first priority in case of a spill is:
    a) protecting people in the spill site
    b) protecting the environment
    c) stopping the spill

12) If a bystander is contaminated with a spilled pesticide, your prime task is to:
    a) get their name, phone number, and insurance company
    b) send them to a hospital
    c) make sure they remove their contaminated clothing, wash down, and receive first aid as appropriate

13) Which of the following is **not** a good way to contain a spill?
    a) using a water hose to spray the spill onto an absorptive surface, such as soil or grass
    b) digging a trench
    c) creating dams and dikes with sorbent snakes or kitty litter

14) Dry spills should be gently covered with a tarpaulin.
    a) true
    b) false

15) What is a recommended method for isolating a spill area?
    a) draft someone to act as a "policeman" to keep other people away
    b) stop working on the spill whenever someone approaches and **quietly** tell them to move away
    c) wait for a policeman, fireman, or other authorized official to arrive

16) What is the first step to take in reporting a spill?
    a) call your office
    b) call 911
    c) call the fire department

17) After you have cleaned up a spill, you should:
    a) decontaminate the area with a 20 percent bleach solution
    b) place all contaminated materials (rags, soil, wood) into the nearest dumpster
    c) reuse any recovered pesticide if possible

18) A one-gallon jug of insecticide concentrate begins leaking. You should immediately:
    a) clear the area and call your office
    b) place the container in a five-gallon bucket
    c) sprinkle kitty litter or spill control absorbent under the container

19) Ground water can become contaminated with a pesticide when:
    a) pesticide leaches down through the soil
    b) pesticide runs down into a well
    c) neither a) nor b)
    d) both a) and b)

20) Which of the following is not an effective method for preventing back-siphoning from a pesticide tank into a water supply?
    a) keep the bypass line clear when filling spray tanks
    b) use a backflow preventer when filling spray tanks
    c) use an air gap when filling spray tanks

21) Which one of the following statements is true regarding pesticide disposal?
    a) disposal regulations apply to rinse water and empty containers as well as to unused pesticides
    b) the rinse water from triple-rinsing a pesticide container can be discarded in a sewer
    c) the rinse water from cleaning a spray rig can be discarded in a sewer

22) Which one of the steps listed below for triple-rinsing a pesticide container is improper procedure?
    a) Drain the "empty" container into your application equipment for at least 30 seconds
    b) Fill the container full of clean water, replace the cap, and swish the liquid around
    c) Pour the rinsate into the sprayer and let it drain for 30 seconds

23) Drift is defined as:
    a) movement of pesticide away from the site or pest you are treating and into nontarget areas
    b) over-application from overlap of spray swaths
    c) translocation of residues through soil

24) As a general rule, to prevent drift, you should stop power-spraying outdoors when the wind exceeds
    a) 10 mph
    b) 15 mph
    c) 20 mph

25) Which action listed below will not reduce the risk of pesticide drift?
    a) use higher pressure to create larger droplet sizes
    b) choose a nozzle that produces a coarse spray
    c) use a "drift reduction" agent in your tank

26) Which one statement about drift is correct?
    a) the risk of drift is limited to the first few minutes after application
    b) by definition, drift is limited to application outdoors
    c) drift can occur with void treatment indoors

answers

Chapter 3

PESTICIDES

3.1 INTEGRATED PEST MANAGEMENT

1) The answer is false. Labels must be complied with regardless of whether IPM is used or not. The answer would not be true under any circumstances.

3.2 TOXICITY AND HAZARD OF PESTICIDES

1) Answer b) is correct. This statement is false because pesticides are subdivided by name according to the pests they control. A rodenticide kills rodents.

2) Answer b) is correct. This statement is true because people that are exposed to excessive levels of a pesticide may notice short-term health effects immediately, or it may take some time to notice long-term effects.

Answer a) is not true because children are more susceptible than adults to toxic effects of most pesticides. Answer c) is not true because, by definition, a pesticide is toxic to some degree and poses some risk to people and the environment. There are nontoxic pest controls but these are not pesticides.

3) Answer c) is correct. Hazard from a pesticide is a combination of the toxicity of the pesticide and the risk of exposure. A fan spray leaves airborne residues and leaves pesticide on accessible surfaces.

Answer a) is incorrect because a void treatment places pesticide into an enclosed area that is not accessible to people and results in little airborne residue. Answer b) is incorrect because a crack and crevice application places small amounts of pesticide into areas where pests hide but that are not accessible to people.

4) Answer b) is correct. Pesticide drift occurs when airborne residues from an application end up in areas where they do not belong such as a neighbor's property, a fish pond, or in a ventilation system.

Answer a) is incorrect because runoff occurs when a pesticide leaches or is washed off of an outdoor surface and contaminates streams, ponds, or ground water. Answer c) is incorrect because drift is avoidable when power-spraying by not applying in winds over 10 mph, by using low pressure, by using nozzles that produce large, heavy droplets, and by use of special "drift-control" additives.

5) Answer c) is correct. The pesticide label does not provide this information. It is up to you to know how to contact your state's department of pesticide regulation and other local authorities.

Answer a) is incorrect because the pesticide label does tell you how to mix the product and how to apply it. Answer b) is incorrect because the pesticide label does tell you where the pesticide can be applied, and sites that are not approved for application.

6) Answer a) is correct. The safety data sheet (SDS) has some of the same information that you find on a pesticide label but provides more technical details on the pesticide's identification, ingredients, characteristics, potential hazards, and safety information. Answer b) is incorrect because, although the pesticide label does have information on how to safely use the product, it does not have the technical detail on its hazards found in the SDS. Answer c) is incorrect because, although your service ticket may list the pesticides and amounts used, it does not provide information on their potential hazards.

7) Answer b) is correct. This statement is false because these words are called "signal words" and refer to the toxicity of the concentrated material inside the container. The diluted or mixed product will be less toxic.

8) Answer b) is correct. Pesticide products labeled WARNING are considered to be moderately toxic. The fatal oral dose for the concentrate is between one and three teaspoonfuls. The product may cause acute illness from oral, dermal, or inhalation exposure, or may cause moderate skin or eye irritation.

Answer a) is incorrect because a pesticide product with a DANGER labeling is considered to be highly toxic. Answer c) is incorrect because a pesticide product with a CAUTION labeling is considered to be slightly toxic or relatively nontoxic.

9) Answer a) is correct. This statement is true because if a product labeled DANGER can cause acute illness through oral, dermal, or inhalation exposure, the label will also carry the word POISON printed in red.

10) Answer a) is correct. This statement is true because most of the products used in the industry are classified as slightly toxic or relatively nontoxic and so have a CAUTION label.

Answer b) is not true because two products with the same signal word may pose different risks if one is to be used full strength and the other is supposed to be diluted. Answer c) is not true because every registered pesticide must have a signal word on the label to show how toxic the product is.

11) Answer a) is correct. Not all chemicals classified by as pesticides by EPA kill pests, some repel pests or attract pests or affect their growth.

Answer b) is wrong because all insect growth regulators are classified by EPA as pesticides. Answer c) is wrong because chemical insect attractants are classified by EPA as pesticides.

12) Answer b) is correct. The hazard of a pesticide or any other toxic chemical is a function of both its toxicity at the degree of a person's exposure to that chemical. For example, the potential hazard to occupants of a room of an insecticide applied into a hidden void is much less than the hazard of the same product when applied as a fan spray to an accessible surface.

Answer a) is incorrect because a chemical's specific gravity has a significant affect on its hazard. Answer c) is incorrect because the signal word is simply a warning about the toxicity of the pesticide inside the original packaging.

3.3 TECHNICIAN EXPOSURE TO PESTICIDES

1) Answer a) is correct. This statement is true because those who apply pesticides face the greatest risk of exposure during mixing and application, and also the greatest risk of both short and long-term health effects.

2) Answer c) is correct. Information on proper sites for pesticide application is not something addressed by the Hazard Communication Standard. This information is given on the pesticide label.

Answer a) is incorrect because alerting you to the hazards and identities of chemicals that you might work with is one of the purposes of the Hazard Communication Standard. Answer b) is incorrect because giving you the right to know what protective measures are available to prevent illness or injury from chemicals is one of the purposes of the Hazard Communication Standard.

3) Answer a) is correct. This statement is true because you must be provided with information and training on hazardous materials. You also must have ready access to the material safety data sheet for each chemical that you use.

4) Answer b) is correct. Ninety-seven percent of all pesticide exposure during spraying is by contact with the skin. Health risks from skin exposure are higher when a pesticide concentrate is involved, rather than a dilution.

Answer a) is incorrect because most products that pose an inhalation risk require the use of a respirator during spraying. Answer c) is incorrect because pesticide poisoning by mouth is more common with children. It can occur, however, if the applicator is eating, drinking, or smoking during application.

5) Answer a) is correct. Emulsifiable concentrates and oil-based sprays are the most absorptive through the skin.

Answer b) is incorrect because dusts and granules are the least absorptive to skin. Answer c) is incorrect because wettable powders and other water-based sprays are somewhere in the middle as far as absorption.

6) Answer b) is correct. Certain parts of the body are more susceptible to pesticides. The genital area, the scalp, ear canal, and forehead absorb pesticide very rapidly.

Answer a) is incorrect because cool, dry skin is less absorptive to pesticide than hot, sweaty skin. Answer c) is incorrect because pesticide dusts are less absorptive on skin than wettable powders.

7) Answer a) is correct. The Precautionary Statements section of a pesticide label will alert you to the need for skin protection with a statement like, "Harmful if absorbed through skin." It may specify the use of gloves and wearing of long sleeves.

Answer b) is incorrect because the Environmental Hazards section of the label gives precautions for protecting animals and the environment but does not discuss personal hazard protection. Answer c) is incorrect because the Physical and Chemical Hazards section of the label alerts you to any special, fire, explosion, or chemical hazards that the product may pose, but does not discuss personal hazard protection.

8) Answer a) is correct. First, check the label and follow its first aid directions for skin exposure.

Answer b) is incorrect because you should begin with this step only if label directions are not available. Then rinse skin and clothing. Answer c) is incorrect because you should not use any first aid or skin ointments. These can make the problem worse and will complicate your treatment when you see a physician.

9) Answer c) is correct. Breathing in pesticide vapors is an example of inhalation exposure to pesticide, not an example of oral exposure.

Answer a) is incorrect because wiping your mouth with a hand (even gloved) that has been handling pesticide is an example of oral exposure. Answer b) is incorrect because smoking a cigarette while applying pesticides can transfer pesticide residues from your hand to your mouth, an example of oral exposure.

10) Answer c) is correct. This statement on a pesticide label or others like "Fatal if swallowed" are warnings of potential oral hazard.

Answer a) is incorrect because this statement on a label is a warning of possible inhalation hazard. Answer b) is incorrect because this statement on a label is a warning of possible dermal hazard.

11) Answer a) is correct. This statement is true because some pesticides, when swallowed, can burn your digestive tract. Other symptoms of oral pesticide poisoning include burning of the mouth and throat and difficulty swallowing.

12) Answer c) is correct. First aid procedures after oral exposure are not the same for all pesticides, so it's important to check the product label first.

Answer a) is incorrect because vomiting after swallowing some pesticides makes the situation more serious. Induce vomiting only if the pesticide label or poison control expert says to do so. Answer b) is incorrect because rinsing your mouth with water should be the next step only if label first aid directions are not available.

13) Answer b) is correct. This statement is false because even if you are wearing the proper respirator, you can still suffer inhalation exposure if your respirator doesn't fit properly, or if you are using old or inadequate filters, cartridges, or canisters.

14) Answer c) is correct. Touching a surface that has just been treated with pesticide might result in skin or dermal exposure to the pesticide but would not result in inhalation exposure.

Answer a) is incorrect because entering a treated area (without proper protection) before the pesticide has been aerated or has had time to dry is a possible cause of inhalation exposure. Answer b) is incorrect because spilling a pesticide in your vehicle can result in airborne residues confined in an enclosed space which is a possible cause of inhalation exposure.

15) Answer a) is correct. This statement is true because symptoms of inhalation exposure may not affect your breathing at all and may appear days later as nausea, headache, chills, and aches.

16) Answer b) is correct. First, get the victim away from the pesticide vapors but make sure that rescuers are wearing respirators or other required protective equipment so that they don't become victims as well.

Answer a) is incorrect because this is a first aid measure for dermal pesticide poisoning. While you should loosen the victim's clothing to aid in breathing, the clothing itself would not normally be contaminated. Answer c) is incorrect because this is a first aid measure for oral pesticide poisoning and would not be a first aid measure for inhalation poisoning.

17) Answer c) is correct. This statement is true because some pesticides may not irritate the eyes at all, but can pass through the eyes to enter the body and cause internal poisoning.

Answer a) is not true because the effects of pesticide in the eye can range from simple eye irritation to eye burns to permanent blindness, depending on the product. Answer b) is not true because the eyes offer a very fast route for pesticide absorption.

18) Answer b) is correct. Wash the affected eye or eyes quickly, but gently. Use an eye wash dispenser if one is available. Otherwise, use a garden hose or faucet.

Answer a) is incorrect because you should not use eye drops if you have gotten pesticide in your eye. Answer c) is incorrect because the time to wear protective goggles was before the incident. The pesticide label will tell you if protective eyewear is necessary when using the product.

19) Answer a) is correct. This statement is true because you should hold your affected eye (or eyes) open and wash with a gentle flow of water across the eye for at least 15 minutes. Use an eye wash dispenser if available, or a garden hose or faucet.

20) Answer a) is correct. Pesticide baits, along with pesticide granules, pose the least risk to the applicator since there are no airborne residues (inhalation hazard), and little chance of dermal or eye exposure during application.

Answer b) is incorrect because dusts have an inhalation hazard during filling and application, and a potential eye hazard from abrasive particles. Answer c) is incorrect because emulsifiable concentrates are absorbed by the skin more quickly than other formulations, there is an eye hazard from splashback, the finished mix conducts electricity, and some products are flammable.

21) Answer b) is correct. This statement is false because, while there is some potential for dermal poisoning, the greatest risk to an applicator from an aerosol is from inhalation of the pesticide during application, especially in confined spaces.

3.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

1) Answer a) is correct. Prescription eyeglasses do not protect you from pesticide spray or splash back. If the pesticide label requires protective eyewear, you must wear special goggles, safety glasses, or a faceshield.

Answer b) is incorrect because long sleeves can be considered as PPE if the label requires that you wear them when mixing or applying the product. Answer c) is incorrect because chemical-resistant gloves are probably the most often specified PPE on a pesticide label.

2) Answer b) is correct. This statement is false because the pesticide label specifies the minimum requirements for protection when using the product. You can, and should, consider using more PPE than the label calls for.

3) Answer a) is correct. Respirators are required by the pesticide label whenever airborne contaminants may affect your health and safety. A respirator protects you from the risk of inhaling pesticides or solvents.

Answer b) is incorrect because gel baits do not become airborne so there is no inhalation hazard. Answer c) is incorrect because a void injection places pesticide into an enclosed space where there is little chance that you will be exposed to airborne residues.

4) Answer b) is correct. This statement is false because fumigation work requires more protection than the standard cartridge respirator. A self-contained breathing apparatus (SCBA) is usually required.

5) Answer c) is correct. A fit test is necessary to make sure your respirator fits you properly. There are different ways to do a fit test. A fit test should be repeated every year, more often if you gain or lose weight or get dentures or glasses, all of which can affect the fit.

Answer a) is incorrect because if you smell pesticide, you've already been exposed. You have to make sure your respirator fits properly before you use it for the first time. Answer b) is incorrect because simply looking in the mirror is not going to tell you if your respirator has a proper seal.

6) Answer b) is correct. This statement is true because, in a positive pressure test, you do cover the exhalation valve, then press lightly and exhale. If the fit is correct, the facepiece should bulge lightly from trapped air.

Answer a) is not true because you should perform a user seal check of your respirator each time you put it on. Answer c) is not true because, in a negative pressure test, you cover the inlet openings with your hands, then inhale. If the fit is correct, the facepiece will collapse slightly.

7) Answer a) is correct. This statement is true. Check the facepiece and headstraps for dirt, grime, cracks, and tears. Remove the cover of the exhalation valve and check for debris underneath. Make sure the valve is seated properly in the valve body and, finally, check the condition of the cartridges.

8) Answer b) is correct. If you can smell pesticide while wearing your respirator (assuming that you have a proper fit) or if you have trouble breathing, change the cartridges and filters.

Answer a) is incorrect because, while you should follow the manufacturer's guidelines for replacing cartridges, the smell of pesticide supersedes those guidelines and means the useful life of the cartridges is already over. Answer c) is incorrect because you should routinely replace cartridges after about 8 hours of use only if the manufacturer's guidelines are not available.

9) Answer b) is correct. If more than one person uses a respirator, it must be cleaned and disinfected after each use.

Answer a) is incorrect because ammonia and other strong detergents can damage a respirator. Use a commercial cleaner designed for that use or a mix of detergent, bleach, and warm water. Answer c) is incorrect because to properly clean a respirator you need to disassemble it.

10) Answer b) is correct. This statement is false because a respirator that is stored in a service kit should be placed in a carrying case or box so that the rubber or plastic parts don't get distorted and misshapen.

11) Answer a) is correct. Chemical-resistant gloves are required if you are handling or applying a pesticide product that contains a solvent. The label may specify chemical-resistant gloves made of nitrile, butyl, or foil-laminate.

Answer b) is incorrect because regular disposable gloves might protect you if you are applying a wettable powder but may not qualify as chemical resistant if you're handling a liquid concentrate. Answer c) is incorrect because liquid pesticides are easily wicked up into cotton gloves. Gloves are considered to be "chemical-resistant" only if there can be no movement of pesticide through the material during use.

12) Answer c) is correct. Unvented goggles offer the best protection if you are applying aerosols since they completely cover your eyes and have no vent openings where pesticide could enter.

Answer a) is incorrect because safety glasses, even with the required brow and side panels, do not cover completely. Answer b) is incorrect because vented goggles have side holes which could allow the aerosol mist to get through the goggles.

13) Answer b) is correct. This statement is false because clothing is considered to be personal protective equipment since it does protect your skin from pesticide to some degree. Some pesticide labels specify that the applicator wear long sleeves and long pants. Disposable coveralls are another form of PPE.

3.5 PROTECTING PEOPLE AND THE ENVIRONMENT FROM PESTICIDES

1) Answer b) is correct. The label's Environmental Hazards section is the primary location for special warning statements concerns hazards to the environment.

Answer a) is incorrect because (1) safety training may or may not address the specific product you are using, (2) you are depending on your memory, (3) environmental hazard information changes with time. Answer c) is incorrect because your supervisor may be wrong, may not remember everything, and the label is ultimately the legal document that you must depend on for pesticide application.

2) Answer a) is correct. Minimize the risk of exposure to pesticides in the environment by using pesticides only after consideration of nonchemical control options.

Answer b) is wrong because, while cost is a consideration in choosing a pesticide, your first decision should be whether or not a pesticide application is needed at all. Answer c) is wrong because, while a pesticide's mode of action may be a consideration in what insecticide to choose in certain instances, particularly if resistance is a problem, it is a minor consideration in minimizing exposure of pesticides in the environment.

3) Answer c) is correct. When use of a pesticide is deemed necessary, choose an effective pesticide product and application method posing the least hazard.

Answer a) is incorrect because how broad the label is does not relate to the potential hazard to health or impact on the environment. Answer b) is incorrect because, while the cost of a pesticide must be considered, the most important consideration in using a pesticide should be minimizing hazard.

4) Answer b) is correct. It is a violation of law to use a pesticide in a manner inconsistent with its labeling.

Answer a) is incorrect because states do not issue permits that give applicators permission to misuse a pesticide. Answer c) is incorrect because using a pesticide inconsistent with its labeling applies to all parts of the label, such as mixing instructions, disposal, precautions, etc.

5) Answer b) is correct. This statement is false because you may **not** apply a pesticide to a site unless that site is listed on the label.

6) Answer a) is correct. Translocation occurs when rodents or other animals carry bait out of the treatment site, say a bait station or rat burrow, into a new location.

Answer b) is incorrect since a technician moving an existing bait to a new site is not translocation, and it would be unusual, as well. Answer c) is incorrect because when predators become sick when they feed on animals killed by a rodent bait it is called "secondary poisoning."

7) Answer c) is correct. The label of rodenticide baits and tracking powders requires that they must be applied out of the reach of children, pets and wildlife or inside tamper-resistant bait stations.

Answer a) is incorrect because, while in wet conditions you might want to protect a bait inside a tamper-resistant bait station, there is no legal requirement that you do so. Answer b) is incorrect because, while you might want to protect a bait inside a tamper-resistant bait station when applying bait at ground level, there is no legal requirement that you do so unless the area was accessible to children, pets and wildlife.

8) Answer b) is correct. The term "secondary poisoning" refers to the situation when a nontarget animal becomes sick after feeding on a poisoned rodent, bird, or other target pest.

Answer a) is incorrect because "primary poisoning" occurs when your target pest is poisoned by your pesticide. Answer c) is incorrect because "secondary hazard" is related to the risk that nontargets might be sickened or killed by "secondary poisoning" after feeding on a poisoned rodent, bird, or other target pest.

9) Answer b) is correct. This statement is false because **all** spills must be cleaned up, not just large ones. The first step after a pesticide spill is to take whatever actions are necessary to protect people and the environment.

10) Answer c) is correct. This statement is true because the early steps you take to control a spill can reduce or eliminate damage or injury, and the faster you act, the less chance the spill will cause harm.

Answer a) is not true because you always need to put on the personal protective equipment necessary to protect yourself while dealing with a spill. Answer b) is not true because you should already have a spill control kit on your vehicle and, even if you don't, you need to deal with the spill as best you can with the material on hand.

11) Answer a) is correct. The safety of people in the spill site should always be your first priority.

Answer b) is incorrect because, while it is important to protect the environment, health and safety takes precedence. Answer c) is incorrect because, while stopping the spill is something you should do as soon as possible, protecting the health and safety of people in the area takes precedence if people are at immediate risk. For example, you may need to move people out of the contaminated area immediately, before you begin dealing with the spill.

12) Answer c) is correct. As with any direct pesticide contamination, your prime task is to see that the victim removes contaminated clothing and washes down in order to remove pesticide residues, and then give first aid as appropriate to the exposure.

Answer a) is incorrect, although it is a good idea to get that information eventually. Answer b) is incorrect because, while in some cases it might be necessary for a bystander to go to a hospital, that is not your call (it should be left to emergency personnel or the person affected), but it is your call to make sure the exposure is eliminated as quickly as possible.

13) Answer a) is correct. Using a water hose to spray the spill onto an absorptive surface, such as soil or grass is not a good way to contain a spill because water will run downhill and carry pesticide residues into many new areas, possibly including water systems.

Answer b) is incorrect because digging a trench is a good way to contain a spill on soil. Answer c) is incorrect because creating dams and dikes is another good way to contain a spill on soil.

14) Answer a) is correct. This statement is true because dry spills (wettable powders, dusts, granules) should be gently covered with a tarpaulin until clean-up begins to prevent them from being dispersed over a wider area.

15) Answer a) is correct. Drafting someone to act as a "policeman" to keep people out of the spill area allows you to concentrate on containing the spill.

Answer b) is incorrect because, if you don't have someone helping keep the area clear, you should loudly tell people to stay out of the area — the more people that hear the warning, the better. Answer c) is incorrect because you want to keep people out of the area until the police or fire department arrives — your main task to protect bystanders.

16) Answer a) is correct. First, call your office for instructions. Depending on the material spilled, the amount of the spill, and state and federal laws, you or your supervisor may have to contact the fire department, police, certain state and federal agencies, or spill "hotlines."

Answer b) is incorrect, because you should call the emergency 911 number only if there is an immediate risk to health and safety, and most spills are not in that category. Answer c) is incorrect because the fire department may or may not need to be involved but that is a decision to be made by management (unless you have a company policy directing you to make such a contact).

17) Answer c) is correct. The best way to deal with spilled pesticide is to recapture it and reuse it as labeled in the proper site at the proper rate.

Answer a) is incorrect because decontamination procedures, if they are needed at all, will depend on the product and the site of the spill (besides, a twenty percent bleach solution is very high and likely to damage some materials). Answer b) is incorrect because contaminated materials, such as rags, soil, and wood, need to be disposed of in a manner consistent with the label … even if dumpster disposal were permitted, it should take place away from the spill site.

18) Answer b) is correct. The quickest and simplest way to contain the spill from a leaking container is to temporarily place the container itself in a large bucket until you determine how to permanently deal with the problem. (Wear gloves.)

Answer a) is incorrect because it is excessive for such a simple spill. Answer c) is incorrect because, while the kitty litter or spill control absorbent would eventually absorb all the pesticide (if enough absorbent was available), it is not as good a solution as b), which is simple, fast, and allows easy repackaging of the pesticide for later use.

19) Answer d) is correct. Ground water can be contaminated by pesticides in many ways including leaching through the soil and running down into a well.

Answer a) is incorrect because it is only one-half the correct answer. Answer b) is incorrect because it is only one-half the correct answer. Answer c) is incorrect because a) and b) are both ways that ground water can be contaminated by pesticides.

20) Answer a) is correct. Keeping the bypass line clear when filling spray tanks is not an effective method for preventing back-siphoning and does not relate to the issue at all.

Answer b) is incorrect because backflow preventers do, in fact, prevent back-siphoning (as the name makes clear). Answer c) is incorrect because an air gap between the fill hose and the tank prevent back-siphoning into the water supply.

21) Answer a) is correct. This statement is true because pesticide applicators are legally responsible for "properly" disposing of their leftover pesticides including rinse water, empty containers, unused pesticides, and soil or other substrate (carpets, furniture, spill control products) contaminated from spills.

Answer b) is not true because rinse water from triple-rinsing pesticide containers contains pesticide residues, is considered a "leftover pesticide," and is best dealt with by putting it into the spray tank as a diluent. Answer c) is not true because rinse water from cleaning a spray rig contains pesticide residues, is considered a "leftover pesticide," and must be dealt with in a manner consistent with the label and state regulations.

22) Answer b) is correct. It is improper triple-rinse procedure to fill the container full with fresh water, it should be filled only 1/4 full.

Answer a) is incorrect because it is proper triple-rinse procedure to drain the "empty" container into the application equipment for 30 seconds to remove the last of the concentrate. Answer b) is incorrect because it is proper triple-rinse procedure to pour the rinsate into the sprayer and let it drain for 30 seconds.

23) Answer a) is correct. Drift is the movement of pesticide away from the site or pest you are treating and into nontarget areas.

Answer b) is incorrect because overlap of spray swaths might indicate a proper application or an over-application but does not indicate drift. Answer c) is incorrect because translocation of residues in soil has nothing to do with drift.

24) Answer a) is correct. Wind of 10 mph is generally considered the maximum in which you would apply a traditional spray subject to drift outdoors (this maximum does not apply to every product or application method).

Answer b) is incorrect because 15 mph is higher than the 10 mph wind that is generally considered the maximum in which you would apply a traditional spray subject to drift outdoors. Answer c) is incorrect because 20 mph is higher than the 10 mph wind that is generally considered the maximum in which you would apply a traditional spray subject to drift outdoors.

25) Answer a) is correct. A higher pressure will not reduce the risk of pesticide drift because high pressure generally creates smaller droplets more susceptible to drift, as well as causing splash back and more spray velocity which also increases the risk of drift.

Answer b) is incorrect because a nozzle that produces a coarse spray will, in fact, reduce the risk of drift because of the larger droplet size. Answer c) is incorrect because "drift reduction" or thickening agents will, in fact, reduce the risk of drift by making larger and heavier droplets that fall from the air faster.

26) Answer c) is correct. Even void treatment can generate drift if applied under too high a pressure, or if it drifts out of the void through holes, electrical outlets, or vents.

Answer a) is incorrect because pesticide drift can, on rare occasions, occur even hours or days after an application when, for example, a dried wettable powder residue is tracked into a restaurant's kitchen on a worker's shoes, or, when the day after a perimeter treatment of a home, a storm blows piles of treated leaves into a nearby fish pond. Answer b) is incorrect because pesticide drift can happen during indoor applications, as well, such as when air conditioners and blowers create indoor wind that moves pesticide where it is not wanted.

study guide

Chapter 4

PESTS

4.1 ANTS

1) Ants are among the most successful of insects.
   a) There are over 12,000 kinds of ants worldwide.
   b) A few dozen commonly cause problems inside buildings and in yards.
   c) Yet those few dozen cause serious problems, and ants have replaced cockroaches as the number one household pest in surveys of pest management professionals.

2) Ants are social insects (like termites, honey bees, and yellowjackets).
   a) Ants live in colonies, which are large cooperative groups.
   b) Two or more generations overlap in the colony.
   c) Adult ants take care of the young.
   d) Adult ants are divided into castes: reproductive castes (queens and kings) and nonreproductive castes (the workers).

3) Ant colony organization varies greatly from species to species.
   a) Some ant species put their trust in a single egg-laying queen (monogyny).
   b) Others produce multiple egg-laying queens (polygyny).
   c) Some species have a single nest, others have multiple nests.
   d) Carpenter ants and a few other species can have a primary nest plus smaller satellite nests containing workers and brood.
   e) Depending on the type of ant, colonies can contain anywhere from dozens of workers up to millions, as in the case of the Argentine ant.

4) Most ants form new colonies by swarming, some by budding, and some by both.

5) Most species of ant have a single queen, a single nest, and form new colonies through swarming.
   a) Swarming is the release of large numbers of winged ants (alates) to mate and form new colonies.
   b) Ants with a single queen tend to be easier to control than those species of ants having multiple queens that form new colonies by budding.
   c) With single-queen, single-nest ants, technicians can effectively spend their time finding the nest, so it can be removed or treated.

6) Budding is the breakaway of a group of ants from a mature colony to form a new colony.
   a) The group usually consists of one or more queens and some workers carrying larvae.
   b) Budding is common with species of ants, such as pharaoh ants, that have multiple queens.

7) Multiple-queen, multiple-nest ants are opportunistic and can be more difficult to control.
   a) Examples include pharaoh ants, Argentine ants, odorous house ants, and some fire ants.
   b) These ants evolved to quickly take advantage of short-lived, patchy, or scarce resources and so are preadapted for man-made environments.
   c) These ants are distributed widely by human commerce.
   d) When disturbed, even only slightly disturbed, by physical changes, flooding, mortality, or chemical irritation, these ants disperse or bud into new colonies.
   e) Infestations in and around buildings can ultimately involve dozens of small colony units, regularly emigrating, dispersing, fusing together again.
   f) Populations of these ants are often best controlled through baiting, because insecticide spray or dust may trigger budding and dispersal.

8) Knowing the food habits of the particular ant species is important in ant management.
   a) It can enable you to find and eliminate the food that is attracting them to the site.
   b) It can help you locate foraging trails to track the ants back to their nest.
   c) It can help you choose an effective bait.

9) Ants feed on many different types of food.
   a) Some species will feed on practically anything; others may limit their food to a narrow range.
   b) Ants infesting structures are typically feeding on "people food," both food in storage (sugar, cakes, cookies, breakfast cereals, etc.) and food from spills and garbage.
   c) Ants may also be preying on other insects, or scavenging on dead insects in windows or lights.

10) Food preferences of ants are often seasonal.
   a) When the queen is actively laying eggs, worker ants typically gather protein-based foods for the queen.
   b) At other times they may ignore protein foods completely and restrict their foraging to sugars and greases.
   c) Knowing the ant's food preference at a particular time is important so you can choose the best ant baits.

11) Many ants obtain sugar by feeding on "honeydew" secreted by aphids and other plant-sucking insects.
   a) Worker ants often defend these insects from predators and tend them as if they were their personal herd of "cows."
   b) Indoor infestations of ants are occasionally traced to large populations of aphids on outdoor foundation plants or indoor houseplants.

12) You should typically spend 80 percent of your time on ant jobs inspecting the account, and twenty percent on control action, not the reverse.
   a) You can spray insecticides and kill hundreds of individual ants without ever solving your ant problem.
   b) Proper inspection and monitoring allows you to identify the ant species causing trouble and locate where the workers are feeding, their foraging trails, and their nest sites (indoors or out).
   c) Ants causing trouble inside a structure more often than not are nesting outside and coming inside to feed.
   d) Ants can also be nesting in walls, behind a baseboard, under the house, or in decayed or rotting wood in the house.

13) Some ants follow definite trails.
   a) If possible, follow these trails to the nest.
   b) If there are children at the account, ask them if they have seen ants and where. Children like to watch ants and can be very useful in tracing their trails.
   c) Ants often trail along baseboards inside rooms and hallways.
   d) Ants may also trail **behind** the baseboard. Try putting a putty knife under the baseboard to entice the ants out or even consider removing a section of the baseboard.
   e) If you see ants in a carpeted room but cannot find their foraging trails, use a pair of needle-nose pliers to pull up small sections of carpet edge and check for ants.
   f) Other areas to check include behind switch plates, on window sills, inside light fixtures, and inside plumbing inspection areas at tubs and shower pans.

14) Some infestations may require an intensive survey program using nontoxic baits to determine likely nesting sites.
    a) Good baits are jelly, honey, peanut butter, bacon grease, or raw liver.
    b) Place the baits (or a combination of baits) inside a commercial ant bait station or on small pieces of cardboard, aluminum foil, masking tape, or plastic pill bottle lids.
    c) Place the baits throughout the building and periodically check them for feeding ants.
    d) Note active sites on a survey diagram. Over a period of days, the survey diagram will pinpoint areas of activity.

15) Be sure to inspect outdoors for ant nests or ant trails.
    a) Look for "ant hills" or mounds and disturb them to see if they contain ants.
    b) Nests may also be constructed next to or under the building's foundation, under sidewalks, driveways and patios, or in decaying logs or tree trunks.
    c) Turn over rocks, boards, flagstones and similar things near the structure.
    d) Check leaf litter and grass against foundation walls.
    e) Check inside equipment and other items that may provide nesting sites or moisture (in-ground sprinkler heads, yard lights, water meter boxes, flower pots, statuary, porch columns, sand boxes, and children's play items).
    f) Look for trailing ants along the edges of sidewalks, walls, tree trunks, tree branches touching the structure, fences, downspouts, and utility lines.

16) For some nocturnal species, such as carpenter ants, you may need to conduct evening inspections (a couple of hours after sunset) when the ants are most active.

17) Caulking and otherwise sealing cracks and crevices used by ants can help suppress the population.
    a) Silicone sealers and expandable caulk products are easiest to use.
    b) Caulking is particularly useful where ants are trailing into a building from outside through holes around electric, gas, and cable service lines, or around deteriorated window frames.

18) There are other steps that customers can take to reduce ant pressure.
    a) Trim the branches of trees located close to structures so the branches do not act as runways from nest sites to roof or siding.
    b) Alter landscaping to minimize the number of aphids and other honeydew-producing insects that attract ants.
    c) Firewood kept indoors should be moved outdoors or regularly inspected for ants.

19) There are only limited ways to eliminate ants without the use of insecticides.
    a) Ground ant nests can be destroyed in certain instances by digging them up and destroying the nest structure.
    b) Steam and heat injection units have been developed for fire ant control but can also destroy other mound builders such as harvester ants and Allegheny mound ants.
    c) Ants can be discouraged from foraging in certain limited sites with sticky barriers. For example, commercially available sticky repellents or petroleum jelly can be applied in a narrow band around table legs to prevent ants from walking up to the tabletop. Double-sided tape can also be used.
    d) Large numbers of worker ants can be mopped or sponged up with soapy water, but this will only have a temporary effect.

20) Baits have many advantages for managing ants.
    a) There is no odor.
    b) There is no risk of drift.
    c) Phytotoxicity is not an issue.
    d) Most baits are ready-to-use.
    e) Customers view baits as clean, safe, and high-tech.

21) But successfully controlling ants with baits requires knowledge and fine tuning on the part of the technician.
    a) Each species of ant has its own food preferences, which can change abruptly with conditions or the season.
    b) What works today may not work tomorrow, even against the same ants in the same location.
    c) Just because a manufacturer lists a particular ant on the label, it doesn't mean that the ant will be interested in feeding on the bait at your account.

22) The key ant baiting concept to remember is this — no single bait works against all ants at all times.
    a) It is best to carry a variety of baits and use a trial and error strategy.
    b) Include a granular and one or more gels, stations, and water baits.
    c) Carry both sugar-based baits to attract sweet-feeding ants and protein-based baits to attract oil and grease-feeding ants.
    d) Don't use large granular baits for small ants. They won't be able to carry the bait back to the nest and recruit others.

23) Be sure to correctly identify the species of ant (or ants) causing the problem so that you can determine what the ants are likely to feed on.

24) Find the food sources the ants are using and eliminate them.
    a) The ants' regular food sources compete with your bait.
    b) The more you can reduce the ants' food supply, the more likely you will get good bait acceptance.
    c) Recommend frequent vacuuming, sweeping, or mopping of floors and washing of counter and table tops to eliminate food ants may be foraging on.
    d) Cereals, sugar, and other bulk food should be stored in plastic containers with snap-on lids, in glass jars with rubber seals, or in a refrigerator.

25) Locate trails and points of entry.
    a) Trails are good baiting sites.
    b) Don't forget to bait outside if the problem ants are nesting there. Most indoor ant problems originate outside.
    c) Identify activity areas and food sources (garbage, honeydew, dead insects under lights, etc.) and incorporate outdoor baiting and other control tactics when practical.

26) Place your baits directly on foraging trails. Some species of ants will not wander an inch off of their trail to feed.
    a) Initially, place small amounts of baits or prebaits in dozens, or even hundreds, of sites.
    b) Once the ants are feeding, you can concentrate on the active sites.
    c) Be sure to leave enough bait to last until your next service visit.
    d) You may need to return after just a few days.

27) Consider prebaiting with a nontoxic bait.
    a) Prebaiting lets you identify feeding areas and determine the best baits.
    b) Prebaiting allows the ants to establish chemical trails that they will continue to follow when you substitute toxic bait.

28) Other insecticide formulations and tactics can also be used to manage ants.
    a) When a nest is known to be located inside a certain void, that void can be injected with a small amount of aerosol, dust, or liquid residual insecticide.
    b) Carpenter ants, acrobat ants, and a few others may nest inside structural wood. In these cases, holes are drilled in the wood in the suspected area and insecticide is injected under pressure into the galleries.
    c) For certain ground-nesting ants that dig deep nests outdoors, a soil drench or mound drench can be effective when other treatments aren't.
        i) A soil drench consists of applying enough insecticide dilution directly to a mound or nest so that the entire nest is "drenched."
    d) A targeted barrier treatment may have a role in keeping outdoor ants from entering a building.
        i) Apply a limited amount of residual insecticide in critical areas such as around windows, window wells, door frames, chimney bases, under deteriorated siding and porches, and in cracks and other openings in damaged foundations.

29) Applying undirected, general insecticide sprays indoors is a poor way to manage ants.
    a) The sprays only "harvest" a small portion of the workers, and have little effect on the colony, the ultimate source of the problem.
    b) Some species are apparently triggered into "budding" new colonies when they contact insecticide near their nests and foraging sites.

4.2 RODENTS

1) Accurate identification of rodents is essential for rodent management.
   a) The vast majority of rodents are not pests at all.
   b) There are over 1500 different species of rodent in the world, and roughly 500 of these are mouse-like or rat-like.
   c) The major pest rodents are the Norway rat, roof rat, house mouse, and deer mouse.
   d) There are important differences in the biology and behavior of the four main pest rodents.

2) There are differences in where you find each of the pest rodents.
   a) Roof rats usually nest in trees, bushes and other dense vegetation, and typically travel above our heads, and enter structures up near the roof.
   b) The Norway rat prefers to live near the ground, typically nesting in burrows and foraging at ground level when outdoors.
   c) House mice can be found in any dark, sheltered locations in and around structures, from below ground to upper floors.
   d) Deer mice are primarily found outdoors, but may move into structures at ground level, particularly during colder weather.

3) The size of the rodents' territories differ as well.
   a) House mice seldom travel more than 30 feet from their nest.
   b) Deer mice can range 50-200 feet.
   c) Norway rats commonly forage 100 feet or more.
   d) Roof rats forage 300 feet or more.

4) Knowing the typical sizes of the different rodents' territories is important in their control.
   a) It's not unusual for a colony of rats nesting outdoors to be feeding at a building more than 100 feet away.
   b) In contrast, a mouse feeding on a countertop is likely to be nesting nearby.

5) Rats and mice react differently to new objects and change.
   a) Mice tend to investigate new objects in their territory. They're curious.
   b) When something new is added, mice will investigate it thoroughly.
   c) Most rats are wary of all things strange or foreign appearing in their territory.
   d) Rats tend to avoid anything new — a bait station, trap, the smell of insecticide.
      i) This can make baiting and trapping ineffective unless special procedures are followed.

6) Feeding behavior also differs greatly between pest rodents.
   a) Mice are nibblers, and may feed twenty different times throughout an evening.
   b) Norway rats are cautious feeders, but once they find a food they like, they may consume a large quantity at a single feeding.

7) Rodents' food preferences are also different, although all will feed on many human foods.
   a) Norway rats will feed on almost any food that people will feed on and are often dependent on human foods and trash.
   b) Roof rats outdoors can survive successfully on berries, seeds, fruits, slugs, shellfish, and snails.
   c) House mice feed on a wide variety of foods but seem to prefer cereals and seeds.
   d) Deer mice feed on insects, seeds, nuts, bird seed, pet food, even other small animals.

8) A mature Norway rat is 12-18 inches from the tip of the nose to the tip of the tail and usually weighs less than a pound.
   a) The Norway rat is never "as big as a cat" as commonly claimed by untrained people.
   b) No one has ever officially recorded a Norway rat bigger than a pound and a half.
   c) Young rats are much smaller.
   d) Individual Norway rats vary greatly in color, but are usually in various shades of brown and gray.

9) The roof rat is sleeker than a Norway rat.
   a) A mature roof rat is about 14-16 inches from the tip of its nose to the tip of its tail (similar to the Norway rat),
   b) The roof rat usually weighs much less—from a quarter-pound to a little over a half pound for a mature adult.
   c) Most are black or nearly black with a gray belly.

10) The small size of the house mouse often surprises people.
    a) An adult mouse usually weighs less than an ounce.
    b) It measures about seven inches from the tip of its nose to the tip of its tail.
    c) Color is variable but there is typically no significant color change between the back and the belly.

11) A deer mouse is roughly the same size as the house mouse.
    a) About six inches from the tip of its nose to the tip of its tail.
    b) A deer mouse weighs about an ounce or less when mature.
    c) Deer mice are bicolored—grayish buff to deep red-brown above and white below.

12) Where the ranges of Norway and roof rats overlap, you need to know how to tell them apart.
    a) The best characteristic is tail length. If you pull a rat's tail over its back, a Norway rat's tail will not reach beyond its ears, a roof rat's will reach its nose or beyond.
    b) The Norway rat is stockier and heavier-looking than the roof rat, and typically lighter colored.
    c) The Norway rat's ears and eyes are smaller and its nose is blunter compared to the large ears, large eyes, and pointed snout of the roof rat.
    d) A roof rat's ears are so large that they can be pulled over its eyes.
    e) Female roof rats have 10 teats while female Norway rats have 12.

13) A very young rat and a very large mouse can also be confused.
    a) A young rat is like a puppy: its feet and head look proportionally bigger than they should.
    b) A young rat's hind foot will measure an inch or longer, while a mouse's will be much shorter than an inch long.

14) House mice and deer mice can be told apart by their tails.
    a) The house mouse's tail is almost naked.
    b) The deer mouse's tail is covered with short fur. Its tail is also sharply bicolored dark above and white below.

15) Carefully inspect a structure and the surrounding areas outdoors when rodents are a problem.
    a) Check for rodent activity, estimate populations, identify travel routes, and pinpoint where rodents are feeding, drinking, nesting, and hiding.
    b) Also identify factors that contribute to rodent feeding or harborage, such as poor trash handling practices, debris piles, lunch food trash not disposed of properly, weeds, etc.

16) Rodents give various signs that they are inhabiting an area.
    a) The most useful signs are burrows (especially for Norway rats), visual sightings of live or dead rats, droppings, tracks, gnawing damage, and grease marks.
    b) The extent of the signs present can be a rough guide to the population level.

17) Rodent populations increase as their resources increase.
    a) The more food and cover, the more rats and mice.
    b) Rodent infestations in and around buildings are usually related to sanitation problems with housekeeping, trash handling, the quality of food storage, clutter, and landscaping.

18) If rats or mice have easy access to food, it is difficult to control them.
    a) Baiting programs fail because the bait can't compete with the rodents' preferred food.
    b) Reducing the rodents' access to food forces them to try for bait in traps or to feed on any rodenticide baits you may have placed in their territory.

19) Clutter provides cover for rodents to nest, hide, and travel unseen and protected.
    a) Both rats and mice are attracted to clutter indoors in storage areas and other sites.
    b) High grass, debris piles, abandoned equipment, and stacks of wood and construction materials are a magnet for both rats and mice outdoors.
    c) When clutter is located near a food source, such as a dumpster or lunch area, the area becomes a prime nesting site.

20) Eliminating clutter drives infesting rats and mice away from an area.
    a) For mice, it also makes trapping more effective, because disturbance in their territory drives them to reinvestigate everything new.
    b) When clutter is eliminated, rats and mice are not attracted as strongly to the site.

21) Dense vegetation draws rodents.
    a) Thick ground covers provide rodents with hiding areas and protection from predators.
    b) The same is true for mound-shaped, ground-hugging shrubs.
    c) Dense vegetation is a food and trash trap providing rats and mice with food and nest materials.
    d) Dense vegetation is difficult to inspect for burrows and rodent activity.
    e) Thorny shrubs such as pyracantha are especially difficult to inspect and prone to capturing windblown trash.

22) Trees should not be close enough to touch a building because rodents can use the branches to find entry.
    a) Ivy, espaliered shrubs, or other plants against walls should be avoided for the same reason.

23) Dumpsters at commercial establishments are the most common source for food for urban populations of rats.
    a) Always inspect dumpsters when servicing commercial accounts, whether they be restaurants, apartments, malls, office buildings, or food plants.

24) Dumpsters should be placed properly, emptied and cleaned regularly, and kept in good condition. Good dumpster management includes the following:
    a) Dumpsters should be located 100 feet from outside doors, if practical.
    b) Dumpsters should be on a concrete pad.
    c) No thick ground covers or dense plantings near dumpsters.
    d) Eliminate weeds and trim grass short.
    e) Schedule frequent pickups to avoid overflowing trash.
    f) Drain plugs should be in place except during cleaning.
    g) Replace dumpsters if damaged, leaking, or rusted through.

25) Rodent-proofing a building means sealing or otherwise eliminating the openings and pathways that rodents use for entry.
    a) To exclude rats, eliminate every critical opening 1/2 x 3/4 inch or larger.
    b) To exclude mice, eliminate openings 1/4 x 3/8 inch.
    c) Mouse proofing is very difficult because of the amount of labor necessary to find and close the large number of 1/4 x 3/8 inch holes found in a typical structure.
    d) Trim trees 6-8 feet back from the roof.

26) Rodents commonly use doors to enter buildings, but they typically go under them rather than through.
    a) Depending on the type of door and the size of the opening, install door sweeps, weather seals, and thresholds.
    b) Fit older wooden doors with a metal cuff and channel, a kick plate, or sheet metal around the bottom and three inches up each side.
    c) Install retrofit weatherseal kits for garage doors which include a heavy rubber gasket that the door closes down onto.
    d) Commercial bay doors that close over rail tracks can be fitted with special devices to block rodent access at the track.

27) Roofs can be a major entry point, not only for roof rats, but for Norway rats.
    a) Rat-proof entryways in and around headhouses, elevator shafts, air conditioning units, and other roof structures on flat-topped commercial buildings.
    b) Rat-proof openings around pipes and utilities.
    c) On the roofs of residences and garden apartments, check for loose and damaged soffits, fascia boards, and shingles, and check for unscreened attic vents.
    d) Chimneys should have caps, mostly to exclude squirrels and raccoons, but also to keep out rats.

28) There are many potential rodent entry points at walls and the foundations.
    a) Screen vents and exhaust fan openings in basements, crawl spaces, bathrooms, and kitchens.
    b) Check for damaged or poorly-fitted dryer vents, which are a common rat entry point in apartments.
    c) Seal cracks and gaps around ground floor and below-grade windows, and repair any damaged bricks or blocks, major concrete cracks, or other breaks in the building foundation walls.
    d) Seal holes around pipes, utility lines, and cables to prevent rat entry.
        i) Don't ignore pipes running up into the structure from the crawlspace, which are prime rat entryways.
    e) Install collars or guards around utility lines to prevent roof rats, in particular, from accessing the building.
    f) Floor drains in commercial buildings should be covered with a brass or bronze drain cover or perforated metal cap.

29) Pest proofing inside a building can create separate compartments, like waterproof doors do in a ship.
    a) Close openings around pipes, utility lines, and other entries into the voids between rooms to isolate infestations in one area, prevent pests from spreading throughout a facility, and make them easier to control.
    b) Pest isolation is especially useful in food plants and large retail food stores where high-risk pest areas, such as the loading dock, receiving, and damaged-goods storage, can be physically isolated from the rest of the facility.

4.3 FLIES

1) Those flies that breed in organic waste are generally called filth flies.
    a) Filth flies include house flies, blow flies, bottle flies, and flesh flies.
    b) They are attracted to rotting and decaying plant or animal materials like manure, garbage, and carcasses of dead animals.
    c) Filth flies can transmit disease-causing organisms because of their habits.

2) Another group of pest flies could be called the "gunk flies."
    a) These are the tiny flies that often breed in the semi-liquid crud or slime that accumulates in drains, cracks, garbage cans, and other sites.
    b) This group includes the fruit flies, moth (drain) flies, and phorid flies.

3) The female fly deposits her eggs on the surface of a good food material for the larvae or maggots.
    a) This may be fermenting fruit in the case of the fruit fly or cow manure in the case of the house fly.
    b) The larvae feed in the food material for several days, then crawl to drier areas, or even leave the food, to pupate.
    c) Under optimum conditions, both the house fly and the fruit fly can develop from egg to adult fly in as little as 8 days.
4) Adult filth flies feed on a wide variety of foods, that range from human foods to manure to carcasses.
    a) The adult filth fly eats by regurgitating fluid onto its food and then sopping up the dissolved result with its sponging mouthparts.
    b) Filth flies also leave fecal deposits wherever they feed.
5) The breeding site for filth flies is almost always within 100 yards of the problem area, but they can travel a mile or more from the breeding site.
    a) The number one breeding site for house flies is animal manure, while blow flies and flesh flies prefer dead animals.
    b) Filth flies will also breed in garbage.
    c) The closer the dumpster or compactor is to a building, the more likely it is to be the source of fly problems.
        i) Look for open dumpsters with crud and liquefying garbage in the bottom, or food garbage spilled nearby.
    d) Other breeding sources for filth flies include rotting garbage in the bottom of garbage cans, overlooked and rotting fruits and vegetables in loading docks or other out-of-the-way sites, grease barrels, rotting grass clippings or spoiled grain.
    e) Filth flies can often be traced to the carcass of a dead rodent or other animal in a wall void.

6) Fruit flies are attracted to ripe or rotting foods and breed in moist, fermenting foods and liquids.
    a) They're found in the semiliquid gunk that accumulates around leaky soda and beer dispensers, unclean or clogged drains, in recycling containers, the bottoms of garbage cans or refrigerator drip pans, in dirty mop buckets, even in catsup or wine bottles.
    b) Overlooked and rotting fruits and vegetables are a prime source.
    c) Because fruit flies need such a little amount of material in which to breed, there are usually multiple breeding sites in an account.

7) Moth flies and phorid flies are found in moist areas with organic matter such as sewers, slimy or clogged drains, dirty garbage cans, garbage disposals, and dirty drip pans.
    a) When you can't find the source of phorid or moth flies in an account, it may mean that there is a break in a sewer line under the slab.

8) You can check for gunk fly larvae by using a knife or spatula to scrape the goo or debris out of drains or crevices.
    a) Spread it on a flat surface, shine your flashlight across the surface, and look for wiggling maggots.
    b) You can check for flies escaping from drains by taping a plastic bag over the drain opening, or suspend a sticky trap over the drain opening.

9) Flies are not necessarily breeding in the same room where they are causing problems.

10) There are sticky traps with an attractant lure available for both house flies and fruit flies that can help pinpoint breeding sites.
    a) Fruit flies like to fly upwards to land on a surface so place sticky traps just above potential breeding sources with the sticky surface facing down.

11) Insect light traps (ILTs) can be effective monitoring tools and can act as an "early warning system" to alert you to fly problems in an account.
    a) Check collection trays or glue boards in ILTs often, usually once a week.
    b) If large numbers of flies suddenly are found in the trap, you can be fairly sure that there is a nearby breeding source.
    c) It may also be that they are flying in from outside through an open window or door.

12) Fly-proofing can be effective in reducing some fly problems.
    a) Screens should be installed and any tears repaired. Screen size must be small enough to keep out the tiniest flies.
    b) Doors, windows and vents should be caulked and tightened.
    c) Door sweeps or weather-stripping should be installed on doors.
    d) Air curtains or air doors installed over loading docks and other open doorways will keep flies from entering.
    e) The client must be sure that doors are not left propped open.

13) Insect light traps (ILTs) can be either sticky board traps or electrocuting traps, and can be freestanding, wall-mounted, or ceiling-mounted.
    a) ILTs use ultraviolet light to attract flying insects.
    b) Flies can see lights from about 25 feet away.
    c) To capture flies, ILTs should be placed low, no more than 4 to 6 feet above the floor.
    d) Empty collecting trays and replace glue boards in ILTs on a regular basis since dead and rotting insects in an ILT will themselves attract dermestid beetles and other scavenger insects into the area.
    e) ILT bulbs should be replaced at least annually.

14) There are many kinds of traps available for fly control in addition to ILTs.
    a) For house flies, there are various types of hanging sticky traps (bars, tubes, tapes), and station or container traps with an attractant.
    b) For fruit flies, there are both disposable traps and refillable station traps or jar traps that use either a liquid or food attractant.
    c) There are also sticky traps for fruit flies, or you can use standard insect sticky traps baited with ripe bananas.

15) A sprayer filled with water, degreaser, and a foaming agent can be used to treat drink dispensers, drains, kitchen equipment, and other sites where fruit flies and other gunk flies breed.

16) Strong air currents will keep flies from entering areas or landing on surfaces.
    a) Air doors or air curtains will keep flies from entering warehouses, grocery stores, etc.
    b) Strategically placed pedestal or rotating fans can be used indoors to keep fruit flies away from produce, salad bars, and drink dispensers.
    c) Outdoors, fans will keep mosquitoes and other flies away while people are dining or barbecuing.
    d) The air movement from fans will also help to dry out scummy, moist fly breeding sites in hard-to-reach areas like under a dishwasher.

17) The key to indoor fly control is to find and eliminate the food source.
    a) Controlling just the visible adult flies by spraying or trapping will not eliminate the fly problem.
    b) The breeding source will continue to produce more adult flies on a daily basis until the source is found and eliminated.

18) The usual application for adult flies indoors is a non-residual space treatment.
    a) The space treatment is applied to kill remaining adult flies after breeding sources have been identified and removed.
    b) Be sure there are no people present and that food and food surfaces are covered.
    c) Be sure to turn off the air-handling system before application.

19) Residual insecticides are also effective for fly control in certain situations.
    a) A residual insecticide can be applied to window sills using a paint brush.
    b) Spot residual insecticide applications can be made to outside areas where flies land to keep them from entering the building.
    c) Residual insecticides are an effective tool on and around dumpsters or compactors.
    d) There are also wet and dry pesticide baits that can be used outside around trash collection areas.
    e) Residual insecticides can be applied to panels and around certain fly traps.

20) Technicians and sales personnel can provide effective guidance to clients to help minimize fly problems.
    a) Food preparation surfaces should be cleaned promptly after use.
    b) Food delivery areas and loading docks should be cleaned regularly.
    c) Food spillage under equipment and leaks or spills from beverage dispensers should be cleaned immediately.
    d) Drip pans under refrigerators and dehumidifiers should be emptied and cleaned.
    e) Drains may need to be cleaned regularly and scrubbed with a stiff brush and an industrial strength drain cleaner or an enzyme or bacterial cleaner.
    f) Janitorial mops, buckets, and slop sinks should be checked to make sure they are not sour and fermenting.
    g) Garbage cans should have tight-fitting lids and should include plastic liners.
    h) Pet feces or manure and any fallen and rotting fruits and vegetables should be picked up from the grounds.
    i) Grass clippings should not be allowed to accumulate.

4.4 COCKROACHES

1) Only a few of the thousands of species of cockroaches are regular pests but these few have adapted totally to the human environment.
    a) Some can live and breed indoors year round.
    b) Most hide by day in small cracks and crevices in human dwellings and come out at night to search for water and small bits of food.

2) The German cockroach, *Blattella germanica*, is the most important domestic cockroach species in North America.
    a) Until recently, this cockroach was the number one pest faced by a technician.
    b) The development of effective cockroach baits have greatly reduced the importance of cockroaches as pests in many sites.

3) Cockroaches are public heath pests.
    a) They can be mechanical transmitters of human pathogens when they crawl over feces or contaminated materials and then crawl over human food, dishes, etc.
    b) The shed skins, egg cases, and feces of cockroaches can produce asthma or allergic reactions in sensitive individuals.

4) Cockroaches are cautious and nervous.
    a) They prefer dark corners and stay out of sight.
    b) The average German cockroach spends about 75% of its time hiding in cracks and crevices.
    c) Because they like to have a crack to quickly dart into, they travel along the edges of walls and other objects.
    d) Given a choice of routes, a cockroach will take the long way around the perimeter, hugging the edges rather than striking out across an open space.

5) Cockroaches feed on everything people feed on and many things we wouldn't consider feeding on.

6) Cockroaches are not attracted to food beyond a short distance.
    a) They must come within a few inches of a food or bait, sometimes literally bumping into it, before they realize they have found food.
    b) Cockroaches learn where food can be found.
    c) They travel between nearby daytime hiding places and their regular feeding sites, usually at night.

7) Cockroaches produce egg cases.
    a) Egg cases can contain from 16 developing nymphs (oriental) to 40 nymphs (German).
    b) The cockroach female carries her egg case for several hours after it is formed. She then deposits or glues it in a protected place.
    c) The German cockroach female is an exception. She carries (and protects) her egg case until only a day or two before it hatches.
    d) Egg cases protect the developing nymphs from insecticide application.

8) The four pest cockroach species tend to occupy different sites in a building.
   a) Each species has different requirements for temperature and moisture.

9) The German cockroach can be found on the first floor or upper floors of a building.
   a) It likes warm, dry areas but since it requires water it is most often found in kitchens and bathrooms, often behind cabinets or appliances.
   b) It is the most common species found in food-handling establishments.

10) The brownbanded cockroach is less common and tends to prefer hotter and drier locations than the German cockroach.
   a) The brownbanded cockroach has less need for water than the German cockroach.
   b) The brownbanded cockroach is often found on upper floors and is more likely to be found away from kitchens and bathrooms, invading bedrooms and living rooms.
   c) The brownbanded cockroach can be found behind objects on the wall, inside televisions and other appliances, and in furniture.

11) The American cockroach is most often found on the ground floor or lower levels of a building in warm, dark, damp areas.
   a) American cockroaches are rarely found above the first floor of a building and are more common in commercial buildings than in residences.
   b) Typical infestation sites are boiler rooms, vending machine rooms, storage rooms, garbage rooms, sewers, and near steam pipes.

12) Oriental cockroaches infest the crawlspace or basement level of a building, preferring cool, dark, damp, and poorly ventilated areas.
   a) Oriental cockroaches are often found in cellars, crawlspaces, basements, garages, or near floor drains, water pipes, water meter vaults, and sewers.
   b) In warm weather, oriental cockroaches are often found outside around building foundations.

13) Sticky traps are useful monitoring tools for cockroaches.
   a) Place insect sticky traps along cockroach travel routes, along edges and in corners of cabinets, counters, etc.
   b) They should be set out and inspected at least once a week where cockroach populations are high.
   c) If populations are low, traps can be checked and replaced monthly.

14) Trap catches can help you determine where to concentrate control efforts.
   a) A floor plan is useful to indicate where traps were placed and which traps caught the greatest numbers of cockroaches.
   b) Make note of possible cockroach harborage areas around these traps.

15) Cockroach-proofing can help reduce movement and hiding areas and can improve the effectiveness of treatments.
   a) Eliminate cockroach habitat by plugging all small cracks around baseboards, wall shelves, or cabinets, pipes, sinks, and bathtub fixtures.
   b) Screen floor drains and keep drain traps full.
   c) Outdoor cockroach populations can be reduced by moving piles of firewood, stone, leaves, and debris away from the building.
   d) Mulch around the foundation should be removed, leaving a 12-inch wide bare or gravel strip instead.
   e) Openings around ground floor doors and windows and around pipes or conduits where cockroaches enter the building should be caulked and sealed.
   f) Ground level vents should be screened.
   g) Repairing screens and adding weather-stripping under doors will help keep outdoor cockroaches from moving inside.

16) When cockroach harborage sites are found, vacuuming can remove egg cases, fecal material, and bits of food waste.
   a) Vacuuming with a HEPA (High Efficiency Particulate Air) filter will also remove allergens to some degree.
   b) Use a crack and crevice vacuum tool to reach areas where cockroaches are hiding or use a flushing agent to drive them out of hiding so they can be vacuumed.
   c) Vacuuming is an option in accounts where insecticides cannot be used.

17) Sticky traps or pheromone traps can be used as a population reduction method in certain sites where insecticides are not allowed, such as an animal rearing room.
    a) Place them along edges and corners and where cockroaches or their droppings have been seen.

18) In commercial accounts, technicians or custodial staff can remove accumulated debris, grease, and other potential food and harborage for cockroaches.
    a) Potential sites include food carts, tray carts, drains, trash rooms, trash cans, dumpsters, compactors, and loading docks.
    b) Power-washing equipment produces a high-pressure stream of water that can be used in some locations, such as commercial kitchens and trash rooms.
    c) Small foamers filled with degreasing chemicals and foaming agents are good for drains, equipment, and trash receptacles.
        i) The foam enables the degreasing solution to remain in contact with the grease and filth long enough for it to dissolve, at which point it is simply washed away.

19) For insecticide sprays, aerosols, dusts, and most baits, the key to controlling cockroaches indoors is to place the insecticide in cracks and crevices where the cockroaches hide.

20) Cockroach baits are available as gel bait, paste bait, containerized bait, and granular bait and are very effective for most cockroaches and sites.
    a) Apply gel or paste baits in small amounts into cracks and crevices where cockroaches hide.
    b) If controlling American or oriental cockroaches with containerized bait, make sure you use the bait stations with larger openings that are designed for these cockroaches.
    c) To control outdoor cockroach populations, there are granular cockroach baits which can be placed inside bait stations around the foundation.
    d) Baits are long lasting. The residual varies with the bait, but can be six months or more if not depleted by feeding.

21) Insect growth regulators are often used along with baits or residual insecticide applications, especially if there is a heavy infestation.

22) Outdoor cockroaches can also be controlled with a perimeter spray around the foundation of the building.
    a) A labeled liquid insecticide should be applied as a coarse spray treating soil, mulch, lower vegetation, and the lower portion of outside walls.
    b) Additional treatment should be made around doorways, windows, and openings around cables and plumbing.

23) Customers have a role in cockroach management.
    a) Cleaning up food and food spills, proper storage of garbage, draining or repairing water sources, and removal of clutter can make the account much less desirable to a cockroach.
    b) Garbage should be placed in sealed plastic bags or in containers with tight-fitting lids and taken to the trash receptacle, dumpster, or trash chute at the end of every day.
    c) Pet food should not be left out, especially overnight.
    d) Stacks of newspapers, magazines, plastic and paper bags, and empty cardboard boxes should be discarded.
    e) Vacuum frequently to remove shed skins, egg cases, and droppings which can attract other cockroaches and cause allergic reactions in some people.

4.5 BED BUGS

1) Bed bugs feed only on blood.
    a) Both adults and nymphs feed on people.
    b) Nymphs need a blood meal in order to molt, and adult females in order to produce eggs.
    c) Humans are the preferred host but bed bugs will also feed on pets, mice, and other animals.
    d) At they suck blood they expand in size and turn darker.

2) Bed bugs feed mostly at night, usually after midnight and before dawn.
    a) They may travel up to 20 feet to feed but usually much less.
    b) A bed bug does not feed every night but usually every few days to a week.
    c) If there are no hosts to feed on, bed bugs can survive for months between meals.

3) Bed bugs hide when they are not feeding and can be very difficult to locate.
   a) They are usually found near human sleeping sites such as a bed, couch, or recliner.
   b) Bed bugs often hide in cracks in the walls, seams of mattresses and box springs, under wallpaper, inside box springs, behind baseboards, and wherever they can find cracks or crevices.
   c) They may also get inside wall and other voids.
   d) Bed bugs like to cluster together in groups.

4) Bed bugs move into new locations in two ways:
   a) Bed bugs can "hitchhike" on secondhand bedding and furniture, on clothing, luggage, backpacks, tote bags, shoes--really anything that spent time in an bed bug-infested location.
   b) Bed bugs can simply walk to another room, much like cockroaches do, through wall and ceiling voids or utility runs, from apartment to apartment, even down hallways.

5) Bed bugs are found mainly in residences, hotels, hostels, and other sites with beds, but they may also be found in non-bed sites such as offices, retail shops, schools, and buses, trains and other modes of transport.

6) Bed bugs are flattened, and range in size from a pin head for a newly emerged nymph up to 1/4-inch long for an adult. Bed bugs are:
   a) Broadly oval in shape.
   b) Wingless and with long antennae.
   c) Unfed nymph is straw-colored; fed nymph is crimson.
   d) Unfed adult is brown; fed adult is reddish brown.

7) Bed bug bites pose little direct health risk to most people.
   a) Bed bugs are not known to transmit any disease.
   b) Some people do not react to bed bug bites, or only react after being bitten a number of times.
   c) For most people, bed bug bites are similar to those from mosquitoes.
   d) A minority may have a more severe reaction with a swollen, inflamed spot that itches intensely; scratching can lead to infection.

8) Bed bug bites look similar to bites from other pests, certain skin diseases, and reactions to chemicals and other contaminants.
   a) The only way to confirm that a bite was caused by a bed bug is to find evidence of a bed bug infestation.
   b) Misdiagnosis of bed bug bites is common, even for doctors.

9) Signs of bed bugs include the following:
   a) Live bed bugs.
   b) Viable bed bug eggs.
   c) Blood spotting and bed bug fecal spotting on bed clothes and walls.
   d) Blood smears on walls (from bugs being crushed by residents).
   e) Shed bed bug skins (from molting).
   f) Reports of bites.

10) Bed bugs are difficult to detect, especially in new or light infestations, and inspections require significant effort and knowledge of bed bug habits.
   a) Finding live bed bugs or viable eggs confirms an active infestation.
   b) Reports of bed bug bites are suggestive but do not confirm an infestation.
   c) Dead bed bugs, hatched eggs, and shed skins may be from an active infestation or an old one.

11) Helpful tools for bed bug inspections may include the following:
   a) Powerful flashlight.
   b) Hand lens or other magnifier.
   c) Mechanic's mirror.
   d) Basic tools (screwdriver, crescent wrench, etc.)
   e) Gloves and knee pads.
   f) Forceps, alcohol, vials, for specimen collection.
   g) Bed bug monitors (for follow-up)

12) Concentrate the inspection around sleeping areas including:
   a) Bed clothes (sheets, pillowcases).
   b) Seams, straps, and other hiding places in mattresses and box springs.
   c) Upholstered coaches and recliners.
   d) Cracks and crevices near sleeping areas (baseboards, utility outlets, wall and floor damage, and the like).
   e) Behind pictures and drapes.

13) If an infestation is found, it is important to convince your customer to also allow inspection of the adjacent rooms or apartments including those above and below.
   a) Rooms and apartments next to infested rooms have a higher risk of having bed bugs.
   b) Bed bugs could have spread to adjacent rooms or the adjacent rooms could be the source of the infestation.

14) Bed control is complex, and a number of tools and strategies are available and are often combined in an IPM approach for best results.
    a) Insecticides are at the core of most bed bug control programs.
    b) Insecticides can be supplemented with nonchemical tools such as vacuums, steamers, cold "freeze" treatments, encasements, and heat treatments.
    c) Successful control requires cooperation and coordination with residents, management, and staff.
    d) Successful control may require 2, 3, or more service visits.

15) Targeted vacuuming can eliminate clumps of bed bugs immediately in heavy infestations.
    a) Use a high power pest control vacuum equipped with a HEPA filter.
    b) Use a crevice tool for corners, edges, seams, etc.
    c) Scrape the tool along the surface to dislodge bed bugs and eggs.
    d) Be careful not to spread bed bugs to new locations on the vacuum.

16) Steam treatments can reduce the amount of insecticides needed and kill all stages of bed bugs hiding in seams, cracks, crevices, and other hiding places.
    a) Place the steamer head in contact with the surface and move it slowly for best effect.
    b) Steam treat sites where live bed bugs or eggs have been seen or suspected.
    c) Steam sites where you find bed bug fecal spotting.
    d) Do not steam heat-sensitive items such as leather, vinyl, painted surfaces, finished or laminated wood, plastic, wallpaper, glued surfaces, or electronics.

17) Heat treatments can be used to control bed bugs in entire apartments, a single room, or in a compartment containing furniture and possessions.
    a) Heat treatment is a specialized technology and requires special equipment and training.
    b) Heat treatment is often combined with other methods of control including insecticides.
    c) Compartment heat treatment can be used to treat heavily infested furniture and personal possessions that cannot be treated by other methods.

18) Mattress and box spring encasements create a barrier around mattresses and box springs.
    a) Encasements can reduce or eliminate the use of insecticides in sleeping areas.
    b) Encasements eliminate the need to discard mattresses and box springs.
    c) Encasements make subsequent inspections much easier.

19) Insecticide application against bed bugs is complicated by concerns over human exposure and the characteristics of bed bugs themselves.
    a) Always read and follow label directions carefully; there will typically be special instructions for use against bed bugs.
    b) Choose insecticide products that have been proven effective in published research and by the experiences of your company and others.
    c) Apply insecticides to places where bed bug activity is seen, or where bed bugs typically hide or travel.
    d) Concentrate on cracks, crevices, voids, seams, under skirting in and around sleeping areas.
    e) Some common treatment sites include bed frames, headboards, baseboards, crown moldings, window and door frames, damaged walls, receptacles and switch plates, and carpet edges.

20) When using insecticides, always be aware of safety.
    a) Avoid application to sites where occupants may regularly contact residues.
    b) Avoid heavy insecticide loads: repeated service visits can mean a buildup of insecticide residues at a site.
    c) It is good practice to not allow people in a room during service and until treatment residues have dried.
    d) Advise occupants of which areas have been treated and tell them when they can reenter and what special precautions might be necessary.
    e) Do not allow pets or children in treatment areas as directed by label directions.

study questions

Chapter 4

PESTS

4.1 ANTS

1) Ants have replaced _____ as the number one household pest.
   a) mice
   b) cockroaches
   c) Indianmeal moth

2) Which one of these is not a characteristic of a social insect?
   a) nest contains only adult insects
   b) live in colonies
   c) adults take care of young

3) All ant colonies have a single queen who lays all of the eggs.
   a) true
   b) false

4) ”Swarming” is defined as:
   a) release of a large number of winged ants from the colony
   b) breakaway of a group of mature ants to form a new colony
   c) movement of ants along a trail

5) Why are ant colonies with a single queen easier to control?
   a) there are fewer ants
   b) there is only one nest
   c) they multiply by budding

6) Which one of the following statements is true about multiple-nest ants?
   a) they are best controlled by insecticide dusts
   b) they bud into new colonies as a result of disturbance
   c) newly-formed colonies have no contact with the parent colony or each other

7) Which one of these statements is false about the feeding habits of ants?
   a) food preferences are often seasonal
   b) ants will feed on other insects
   c) ants prefer protein foods

8) Some ants will defend aphids from predators so they can feed on the “sugary” honeydew that the aphids secrete.
   a) true
   b) false

9) On a typical ant job, you should spend about 20% of your time inspecting, and 80% implementing control measures.
   a) true
   b) false

10) If you see ants in a carpeted room, but can’t find their foraging trails, you should:
   a) spray insecticide along baseboards
   b) pull up the edges of the carpet
   c) apply a general application to the carpet

11) To survey for ants using nontoxic baits, you should:
   a) use food baits like jelly or bacon grease
   b) place baits at the entrance to the nest
   c) place baits directly on surfaces where ants are foraging

12) Which one of these is not a likely place to find an ant nest outside?
   a) under a sidewalk
   b) inside a meter box
   c) a barbecue grill

13) Most carpenter ants are most active at midday.
   a) true
   b) false

14) Caulking to keep ants out of buildings is not an effective tool.
    a) true
    b) false

15) Which one of the following is not a nontoxic way to destroy ground ant nests?
    a) steam and heat injection
    b) digging them up
    c) insecticide injection

16) When using insecticide baits for pharaoh ants, you should:
    a) experiment with a variety of baits
    b) use a bait with a large granule size
    c) avoid switching between granular baits and gel baits

17) You should not eliminate the ants' regular food sources while you conduct your baiting program.
    a) true
    b) false

18) Which one of the following statements is false?
    a) most indoor ant problems come from ants that are nesting indoors
    b) ant trails are good baiting sites
    c) identifying the species of ant will help you determine what they might be feeding on.

19) In the beginning of an ant baiting program, you should:
    a) make only a few bait placements in areas where you have seen ants
    b) make only a few bait placements in areas where you have not seen ants
    c) make lots of bait placements in many different areas

20) Putting out a nontoxic ant food bait before you begin your actual toxic baiting program is called:
    a) phytotoxicity
    b) prebaiting
    c) polygyny

21) When an ant nest is known to be located inside a certain void, which one of these would be an acceptable treatment?
    a) inject the void with insecticide
    b) do a mound drench
    c) apply a targeted barrier treatment

4.2 RODENTS

1) The major pest rodents are the Norway rat, roof rat, _____, and house mouse.
    a) vole
    b) mole
    c) deer mouse

2) Which pest rodent is most likely to be found nesting in a tree?
    a) roof rat
    b) house mouse
    c) Norway rat

3) The approximate size of a Norway rat's foraging territory is:
    a) less than 30 feet from the nest
    b) 100 feet or more from the nest
    c) 300 feet or more from the nest

4) Mice are curious and will investigate new objects in their territory.
    a) true
    b) false

5) Mice usually consume a large amount of food in only one or two feeding sites.
    a) true
    b) false

6) Which pest rodent is primarily a "vegetarian," feeding on berries, fruits, and seeds?
   a) house mouse
   b) roof rat
   c) Norway rat

7) Compared to the roof rat, the Norway rat is:
   a) larger
   b) smaller
   c) about the same

8) Which one statement is not true about the house mouse?
   a) the color of its back and belly are approximately the same
   b) it weighs about 1/4 pound
   c) it's about 7 inches long

9) One of the best ways to tell a deer mouse from a house mouse is by its coloration.
   a) true
   b) false

10) Which one of these is not a good characteristic to use to tell a Norway rat from a roof rat?
   a) tail length
   b) ear size
   c) color of fur

11) A young rat's feet:
   a) are small compared to the rest of its body
   b) are an inch or more in length
   c) have no fur

12) A deer mouse's tail is:
   a) covered with short fur
   b) almost naked
   c) the same color overall

13) Which one of these is not a sign that Norway rats may be inhabiting an area?
   a) gnawing damage
   b) grease marks
   c) pointed droppings 1/8-inch long

14) Which one of these is a true statement?
   a) rodents avoid areas with lots of clutter
   b) the more food and cover, the more rodents
   c) sanitation is not a factor in rodent infestations

15) Eliminating clutter in a mouse's territory drives him to reinvestigate everything.
   a) true
   b) false

16) Rodents are attracted to dense vegetation because:
   a) it provides protection
   b) it collects trash
   c) both of the above

17) To help control rodents, dumpsters should:
   a) have drain plugs removed
   b) be surrounded by dense shrubbery
   c) be located 100 feet from outside doors

18) To rodent-proof a building for rats, you need to eliminate every opening that is:
   a) 1/4 by 3/8 inch
   b) 1/2 by 3/4 inch

19) Which rodent is most likely to enter a building from the attic area?
   a) house mouse
   b) Norway rat
   c) roof rat

20) One reason to rodent-proof a building is to isolate pests in separate "compartments."
   a) true
   b) false

4.3 FLIES

1) Which one of these flies is considered to be a "filth fly?"
   a) cluster fly
   b) blow fly
   c) mosquito

2) In what kind of material are moth (drain) fly larvae most likely to be found?
   a) animal feces or manure
   b) animal carcasses
   c) semi-liquid organic slime

3) In what kind of material are house fly larvae most likely to be found?
   a) cow manure
   b) fermenting fruit
   c) soil in a potted plant

4) After completing their development, house fly larvae pupate in the organic material they were feeding on.
   a) true
   b) false

5) Under ideal conditions, the house fly can develop from egg to adult fly in as little as _____ days.
   a) 3
   b) 8
   c) 13

6) Which one statement is not true about house flies?
   a) they feed only in animal manure
   b) they defecate on their food
   c) they regurgitate on their food

7) Filth flies are most often found within 100 yards of their breeding site.
   a) true
   b) false

8) Which one statement is true about fruit flies?
   a) there is usually just one main breeding site in an account
   b) they breed in moist, fermenting foods
   c) they usually signal a sewer break

9) Which fly is often associated with a sewer line problem in a building?
   a) phorid fly
   b) fruit fly
   c) blow fly

10) Sticky traps for fruit flies should be placed above breeding sources.
   a) true
   b) false

11) Which one of these is not something that would be done to fly-proof a warehouse?
   a) repair screens
   b) install ultraviolet bulbs instead of regular bulbs
   c) install air curtains or air doors

12) When installing insect light traps (ILTs) to control flies, you should:
   a) install traps at ceiling level
   b) use only electrocuting traps
   c) replace bulbs at least annually

13) The only effective trap for fruit flies is an electrocuting light trap with a sticky board surface.
   a) true
   b) false

14) Which one of these statements is true?
   a) air currents can keep flies from entering areas
   b) sticky traps are not effective in controlling house flies
   c) degreasers or foamers should not be used to control flies around food service equipment

15) Which one of these is the single most important step in fly control?
   a) applying a non-residual space treatment
   b) installing insect light traps
   c) finding and eliminating the food source

16) Only non-residual insecticides should be used for fly control indoors.
   a) true
   b) false

4.4 COCKROACHES

1) Which one of these statements about cockroaches is true?
   a) there are four species of cockroaches
   b) some cockroaches can live and breed indoors year round.
   c) cockroaches are most active during the day

2) Which one of these is the most important cockroach pest in North America?
   a) brownbanded cockroach
   b) German cockroach
   c) oriental cockroach

3) Cockroaches can cause asthma or allergic reactions in sensitized people.
   a) true
   b) false

4) When cockroaches move from place to place, they:
   a) take the shortest route
   b) spend most of their day on the move
   c) travel along edges

5) Which one statement is true about cockroaches and food?
   a) they can detect food from a considerable distance
   b) they usually search for food at night
   c) they find food accidentally

6) The German cockroach carries her egg case until just before it hatches.
   a) true
   b) false

7) A German cockroach's egg case can contain up to _____ developing nymphs.
   a) 6
   b) 16
   c) 40

8) Which pest cockroach has the least need for available water and prefers hot, dry areas?
   a) German cockroach
   b) brownbanded cockroach
   c) American cockroach

9) Which pest cockroach is typically found only on the lowest level of a building?
   a) oriental cockroach
   b) German cockroach
   c) brownbanded cockroach

10) The oriental cockroach is the most common cockroach found in food-handling establishments.
   a) true
   b) false

11) A typical infestation site for an American cockroach is:
   a) boiler room
   b) crawlspace
   c) apartment bedroom

12) Which one of these is not a good location in which to place a sticky trap to catch German cockroaches?
   a) in the back corner of a kitchen cabinet
   b) along the side edge of a shelf under a bathroom sink vanity
   c) in the middle of a kitchen shelf

13) To prevent outdoor populations of cockroaches from entering a building, you should:
   a) add a layer of mulch around the foundation
   b) move firewood away from the building
   c) make sure that floor drain traps are dry and clean

14) Vacuuming to remove cockroaches and their allergens has not been proven to be effective.
   a) true
   b) false

15) Which one of these statements is true about cleaning to prevent cockroach problems in commercial accounts?
   a) power-washing should not be used indoors
   b) food carts and tray carts should be cleaned and degreased
   c) degreasers should not be used in drains

16) When using insecticides to control cockroaches indoors, fogging is the best application method.
   a) true
   b) false

17) Which one of these statements is not true about controlling cockroaches with baits?
   a) only gel baits can be used indoors
   b) baits can last for months if not eaten
   c) granular baits can be used outdoors

18) Insect growth regulators can be used with residual insecticides to control cockroaches.
   a) true
   b) false

19) Which one of this is not a likely treatment site for outdoor cockroaches?
   a) mulch around the foundation
   b) door thresholds
   c) attic vents

4.5 BED BUGS

1) Which statement about bed bug feeding is false?
   a) nymphs need to feed on blood before molting
   b) small nymphs feed on blood or fecal droppings
   c) humans are the preferred host

2) Which statement about bed bug feeding is true?
   a) bed bugs never travel more than 5 feet to feed
   b) bed bugs feed every night
   c) bed bugs can survive for months without feeding

3) Bed bugs feed mostly between midnight and before dawn
   a) true
   b) false

4) Which harborage site is not typical for bed bugs?
   a) kitchen cabinet
   b) behind baseboard
   c) mattress seam

5) Bed bugs are primarily found close to sleeping areas.
   a) true
   b) false

6) Bed bugs always move to new locations by "hitchhiking."
   a) true
   b) false

7) Which statement about bed bug appearance is false?
   a) broadly oval in shape
   b) only adult females have wings
   c) adult about 1/4-inch long

8) Which statement about bed bug bites is false?
   a) bed bugs sometimes transmit hepatitis and West Nile virus
   b) some people do not react to bed bug bites
   c) most bite reactions are similar to mosquito bites

9) The only way to confirm that bed bug bites are being caused by bed bugs is to find evidence of a bed bug infestation.
   a) true
   b) false

10) Which sign is not a sign of bed bugs?
   a) viable bed bug eggs
   b) blood spotting on bed sheets
   c) wings on windowsill

11) Which sign does NOT confirm there is a bed bug infestation?
   a) bites on an occupant
   b) live bed bug nymph
   c) viable bed bug egg

12) Which statement is false?
   a) Rooms and apartments next to infested rooms have a higher risk of having bed bugs
   b) Bed bugs could have spread to adjacent rooms or the adjacent rooms could be the source of the infestation
   c) Adjacent rooms you need to inspect after finding an infestation are limited to those on either side

13) Which statement about bed bug control is true?
   a) Vacuuming is the core of most bed bug IPM programs.
   b) Successful bed bug control requires cooperation from residents, management, and staff.
   c) Most good bed bug control programs eliminate bed bugs after one service visit.

14) Targeted vacuuming can eliminate clumps of bed bugs immediately in heavy infestations.
   a) true
   b) false

15) Which statement is false about vacuuming for bed bug control?
   a) use a crevice tool in corners
   b) use a vacuum equipped with a HEPA filter
   c) vacuuming cannot spread bed bugs to new sites

16) Steam treatments can reduce the amount of insecticide needed to control bed bugs at a site.
   a) true
   b) false

17) Which statement about steaming for bed bug control is false?
   a) all surfaces can be safely steamed
   b) steam sites where you see bed bug fecal spotting, eggs, or bugs
   c) move the steamer head slowly for best effect

18) Heat treatment is never combined with other methods of bed bug control.
   a) true
   b) false

19) Which statement is false about encasements?
   a) Encasements can reduce or eliminate the use of insecticides in sleeping areas.
   b) Encasements eliminate the need to discard mattresses and box springs.
   c) Encasements make subsequent inspections more difficult.

20) Which statement about insecticide treatment for bed bugs is true?
   a) All areas of a room need to be treated for successful control
   b) Insecticide application against bed bugs is complicated by concerns over human exposure and the characteristics of bed bugs themselves
   c) Heavy insecticide loads are essential in order to control bed bugs

answers Chapter 4 Pests

4.1 ANTS

1. Answer b) is correct. In past years, cockroaches were the main household pests that pest control companies dealt with. However, the advance of cockroach baits and the absence of general spraying has resulted in the success of ants.

   Answer a) is incorrect because, although mice are present in many buildings, they were never as important as cockroaches. Answer c) is incorrect because Indianmeal moths may have been the number one stored product pest, but they have not been the number one pest overall.

2. Answer a) is correct. The nest or colony of a social insect contains two or more generations. Adults, larvae, and eggs may all be present at the same time inside the colony or nest.

   Answer b) is not correct because social insects like ants do live in colonies which are basically large, cooperative groups. Answer c) is incorrect because adult ants do feed and groom the young larvae.

3. Answer b) is correct. This statement is false because many ant species have multiple egg-laying queens, a condition called polygyny.

4. Answer a) is correct. Swarming occurs when winged ants or alates leave the colony in large numbers with the purpose of mating and founding new colonies.

   Answer b) is incorrect because breakaway of worker ants carrying larvae with a queen or queens is called "budding." Answer c) is incorrect because many ants do follow a pheromone trail between their nest and the food source, but this is not the same as swarming.

5. Answer b) is correct. A single queen ant colony has only one nest so the technician needs to find and treat, or remove, only one nest rather than dealing with multiple nest sites.

   Answer a) is incorrect because single queen colonies can be very large. Answer c) is incorrect because single queen colonies form new colonies by swarming, not budding.

6. Answer b) is correct. Multiple-nest ants, like pharaoh ants, respond to physical changes like flooding or chemical irritation by dispersing or budding into new colonies.

   Answer a) is not true because irritation from insecticide dusts or sprays may trigger budding. Baits are the best choice for multiple-nest ants. Answer c) is not true because budded colonies may move, disperse, and even fuse together again.

7. Answer c) is correct. Ants may gather protein foods at certain times, such as when the queen is laying eggs. At other times, however, they may ignore protein foods in favor of sugars and grease.

   Answer a) is true because ants' feeding habits may change depending on the time of year, the growth requirements of the colony, or stress on the colony. Answer b) is true because ants may feed on other insects or scavenge on dead insects found around windows or in lights.

8. Answer a) is correct. This statement is true because ants will actually "tend" aphids and other plant-sucking insects in exchange for the honeydew. Indoor infestations of ants can sometimes be traced to large populations of aphids on plants.

9. Answer b) is correct. This statement is false because it's just the opposite. Spend 80% of your time inspecting the account to identify the ant species, their foraging trails, and their nest sites.

10. Answer b) is correct. Use a pair of needle-nose pliers to pull up small sections of carpet next to the baseboards and look for trailing ants.

    Answer a) is incorrect because spraying insecticide randomly will cause some ants to break up their colony into several new nests. Answer c) is incorrect because (1) insecticide labels generally do not direct applicators to apply a general treatment to a rug for ant control, and (2) it is not a very efficient use of insecticide — ants generally do not trail randomly across a carpet and much less insecticide could be far more effective if applied in the proper location

11. Answer a) is correct. Baits like jelly, honey, peanut butter, bacon grease, or raw liver can be attractive to ants. Experiment with different foods to determine whether the ants prefer sweets or protein foods.

    Answer b) is incorrect because the point of surveying is to have the ants lead you to the nest. If you already know where the nest is, there is no reason to place nontoxic baits. Answer c) is incorrect because food baits should be placed in ant bait stations or on pieces of cardboard, aluminum foil, masking tape or similar so that they can be easily removed and won't stain surfaces.

12. Answer c) is correct. A barbecue grill is not a likely place to find nesting ants. Ants like a place that is protected but moist. A barbecue grill is probably too hot and dry to serve as a nest site for ants.

    Answer a) is incorrect because ants frequently nest along and under foundations, sidewalks, driveways, and patios. Answer b) is incorrect because ants often nest inside outdoor equipment such as meter boxes, sprinkler heads and yard lights.

13. Answer b) is correct. This statement is false because carpenter ants are most active at night. Start your inspection a couple of hours after sunset.

14. Answer b) is correct. This statement is false because caulking can be useful, particularly where ants are entering a building through openings around electric, gas, or cable service lines.

15. Answer c) is correct. Insecticide injection can be used to treat ant nests, but it is not a nontoxic method.

    Answer a) is incorrect because steam and heat injection are nontoxic ways to destroy the nests of mound building ants. Answer b) is incorrect because some ants nests can be destroyed, without the use of insecticides, by simply digging them up.

16. Answer a) is correct. Try a variety of food baits, both sugar-based and protein based, because ants' feeding preferences can change abruptly with conditions or the season.

    Answer b) is incorrect because a large granule bait won't work for small ants like the pharaoh ant. They won't be able to carry the bait back to the nest. Answer c) is incorrect because you should try both dry and wet baits to see which works best. Use a granular bait and one or more gels, stations, or water baits.

17. Answer b) is correct. This statement is false because you should eliminate the ants' food supply by vacuuming, sweeping, washing counter tops, etc. The more you reduce the ants' food supply, the more likely you will get good bait acceptance.

18. Answer a) is correct. This statement is false because most indoor ant problems actually come from ants that are nesting outdoors but are foraging inside looking for food or moisture.

    Answer b) is incorrect because ant trails are good sites for your baits. The ants are already following these trails to find food and some ants will not wander off their trails at all to find your bait. Answer c) is incorrect because identifying the ants will also tell you what their food preferences are.

19. Answer c) is correct. Initially, place small amounts of bait in dozens, or even hundreds of sites until you can locate prime feeding sites. Once the ants are feeding, you can concentrate on the active sites.

    Answer a) is incorrect because placing only a few baits may not find all of the potential baiting sites and the bait may be eaten before you can replace it. Answer b) is incorrect because bait placements should be made in areas where you have seen ants and along their foraging trails since you want them to find and eat the bait.

20. Answer b) is correct. Prebaiting with a nontoxic bait lets you identify areas where ants are most actively feeding, lets you determine which food is most acceptable to the ants, and allows the ants to establish foraging trails.

    Answer a) is incorrect because phytotoxicity is a term used to denote injury to plants from chemicals. Answer c) is incorrect because polygyny is a term use to denote an ant colony with multiple egg-laying queens.

21. Answer a) is correct. The void can be injected with a small amount of aerosol, dust, or liquid residual insecticide.

    Answer b) is incorrect because a mound or soil drench is used only for outdoor nests. Answer c) is incorrect because a targeted barrier treatment is done outdoors to keep ants from entering around windows, door frames, cracks in the foundation, etc. not to control ants already nesting inside a void.

4.2 RODENTS

1. Answer c) is correct. The deer mouse is now considered a primary pest rodent, largely due to abundance and its role in the transmission of hantavirus.

    Answer a) is incorrect because while the vole can be a pest in yards and gardens, it rarely enters buildings. Answer b) is incorrect because the mole is not a rodent and does not enter buildings.

2. Answer a) is correct. The roof rat tends to nest high up off of the ground, typically in trees, bushes, or ivy on the side of a building, or in attics or ceiling voids.

    Answer b) is incorrect because the house mouse nests mainly indoors in any dark, sheltered location. Answer c) is incorrect because the Norway rat nests near the ground, usually in burrows.

3. Answer b) is correct. A Norway rat commonly forages 100 feet or more from its nest in its search for food each night.

    Answer a) is incorrect because this is the foraging range of a house mouse. Answer c) is incorrect because this is the foraging range of a roof rat.

4. Answer a) is correct. This statement is true because mice constantly re-explore their territory and will check out anything that has been added or that is out of place.

5. Answer b) is correct. This statement is false because mice are nibblers. They may feed twenty different times in many locations throughout an evening.

6. Answer b) is correct. Unlike the Norway rat, the roof rat prefers to feed on plant materials. Outdoors, roof rats feed on fruits, berries, vegetables, seeds, slugs, and snails.

    Answer a) is incorrect because the house mouse feeds on a variety of foods, but prefers cereals, grains, and seeds. Answer c) is incorrect because the Norway rat feeds on most anything that people feed on, but it prefers protein foods, not plant material.

7. Answer a) is correct. The Norway rat is bulkier and larger than the roof rat, being 12-18 inches from the tip of the nose to the tip of the tail and weighing just under a pound.

    Answer b) is incorrect because the roof rat is smaller and sleeker than the Norway rat. It is about 14-16 inches from the tip of its nose to the tip of its tail but weighs only 1/4 to a little more than 1/2 pound. Answer c) is incorrect because although the Norway rat and roof rat are similar in overall length, this is because the roof rat has a much longer tail. Its body size and weight is much less than the Norway rat.

8. Answer b) is correct. It is not true that the house mouse weighs 1/4 pound (4 ounces). An adult mouse weighs less than an ounce.

    Answer a) is incorrect because it is true that (unlike the deer mouse) there is no significant color change between a house mouse's back and belly. Answer c) is incorrect because it is true that a house mouse measures about 7 inches from the tip of its nose to the tip of its tail.

9. Answer a) is correct. The deer mouse has a white belly that is distinctly separated from the darker color of its back, while the house mouse is approximately the same color top and bottom.

10. Answer c) is correct. Color of fur is not a good distinguishing characteristic since both rats are variable in color. Norway rats usually range from brown to gray and roof rats are nearly black with a gray belly but there is much overlap in fur color.

    Answer a) is incorrect because tail length is a distinguishing characteristic. If you pull a rat's tail over its back, the Norway rat's tail will not reach beyond its ears, while the roof rat's tail will reach its nose or beyond. Answer b) is incorrect because a roof rat's ears are much larger and can be pulled over its eyes.

11. Answer b) is correct. A young rat's hind foot is an inch or more long while a mouse's foot is much shorter than an inch.

    Answer a) is incorrect because a young rat's feet are proportionally bigger than the rest of its body, just like a puppy's. Answer c) is incorrect because a young rat's foot does, in fact, have a covering of fur.

12. Answer a) is correct. A deer mouse's tail is covered with short fur.

    Answer b) is incorrect because the deer mouse's tail is covered with fur while the house mouse's tail is mostly naked. Answer c) is incorrect because the deer mouse's tail, like its body, is dark above and white below.

13. Answer c) is correct. Pointed droppings around 1/8-inch long indicate young house mice, not Norway rats.

    Answer a) is incorrect because gnawing damage is a sign of rodent infestation. Rodents gnaw both to wear down their incisors and to enlarge or create openings along their travel routes. Answer b) is incorrect because rodents do leave grease or rub marks (from oils in their hair) on surfaces that they constantly rub against.

14. Answer b) is correct. This is the true statement because rodent populations tend to increase as their resources increase. If they have abundant food and harborage sites, they will continue to reproduce.

    Answer a) is not true because rodents like clutter since it provides protected areas in which to nest, hide, and travel. Answer c) is not true because rodent problems in and around buildings are related to problems with housekeeping, trash handling, and buildup of clutter.

15. Answer a) is correct. This statement is true because mice are curious about any changes in their territory. Eliminating clutter and moving items can make control more effective since mice will check out traps and baits.

16. Answer c) is correct. Heavy vegetation provides rodents with hiding areas and protection from predators (a). It collects food and trash which provides nest material (b), and it makes inspection difficult.

17. Answer c) is correct. Whenever possible, dumpsters should be 100 feet away from structures so that pests are not drawn into the facility.

    Answer a) is incorrect because drain plugs should be left in place (except during cleaning) so that rodents cannot enter the dumpster through the plug hole. Answer b) is incorrect because dense shrubbery around a dumpster provides shelter for rodents, hides burrows, and collects food trash.

18. Answer b) is correct. A young rat can squeeze through an opening that is 1/2 by 3/4 inch or larger.

    Answer a) is incorrect because an opening that is only 1/4 by 3/8 inch is too small for even a young rat. An opening this size will admit a mouse, however.

19. Answer c) is correct. The roof rat is a climber that is very at home in trees and will run across cables, lines, and branches to reach a building. The roof rat prefers to travel up off of the ground.

    Answer a) is incorrect because, while the house mouse can be found on higher levels in a building, it usually enters near the ground level. Answer b) is incorrect because, although the Norway rat can enter a building from the roof, it is more comfortable nesting and traveling at ground level.

20. Answer a) is correct. This is a true statement because closing openings around pipes and utility lines, and closing entries into voids can isolate rodent infestations in one area, preventing them from spreading throughout the building, and making them easier to control.

4.3 FLIES

1. Answer b) is correct. Filth flies, like the blow fly, breed in organic waste such as rotting and decaying plant or animal materials like manure, garbage, and carcasses.

    Answer a) is incorrect because cluster flies lay their eggs in soil where the larvae feed on earthworms. Answer c) is incorrect because mosquitoes lay their eggs in stagnant water or in areas that will be flooded, not in organic waste.

2. Answer c) is correct. Moth or drain flies belong to a group of small flies that breed in the semiliquid crud or slime that accumulates in drains, cracks, and other similar sites.

   Answer a) is incorrect because it is the "filth fly" group that feeds in animal feces. Answer b) is incorrect because again, it is the filth flies that feed on dead animals.

3. Answer a) is correct. House flies lay their eggs in decaying animal or plant materials. Animal manure is their favorite food source.

   Answer b) is incorrect because while house fly larvae can occasionally be found in rotting produce, fermenting fruit is where you would expect to find fruit fly larvae, not usually house fly larvae. Answer c) is incorrect because an over-watered potted plant might be the source of fungus gnats, but not house flies.

4. Answer b) is correct. This statement is false because house fly larvae, and the larvae of most other flies that develop in wet materials, leave their feeding site for a drier, cooler place in which to pupate.

5. Answer b) is correct. If temperature and humidity are optimal and there is plenty of available food, the house fly life cycle can be completed in as few as 8 days.

   Answer a) is incorrect because even under ideal conditions, it takes longer than 3 days for a house fly to go from egg to adult. Answer c) is incorrect because it may take 13 days if temperature and humidity are not ideal, or if there is a shortage of larval food, but optimal development time is much shorter.

6. Answer a) is correct. This statement is not true because while house flies are found most often in animal manure, they can feed and develop in a wide variety of materials, ranging from garbage, to manure, to animal carcasses.

   Answer b) is true because house flies leave fecal deposits wherever they feed. Answer c) is true because house flies eat by regurgitating fluid onto their food and then using their sponging mouthparts to sop it up.

7. Answer a) is correct. This statement is true because, although filth flies can travel a mile or more from their breeding site, they are generally found within 100 yards of where the larvae developed.

8. Answer b) is correct. This statement is true because fruit (or drosophila) flies are attracted to ripe or rotting foods and liquids and are found in the semiliquid "gunk" around soda dispensers, in drip pans, clogged drains, or in bins of rotting fruits or vegetables.

   Answer a) is not true because there are usually multiple fruit fly breeding sites in an account since they require such a very small amount of material in which to develop. Answer c) is not true because fruit flies are not typically associated with sewer breaks—phorid flies and moth flies are.

9. Answer a) is correct. Phorid flies are often found in damp areas with semiliquid organic matter such as dirty drains and sewers. If you can't find the source of phorid flies in an account, it may mean that there is a break in the sewer line under the slab.

   Answer b) is incorrect because fruit flies feed on ripe or fermenting foods and liquids. Answer c) is incorrect because blow fly larvae feed primarily on dead animals.

10. Answer a) is correct. This statement is true because fruit flies tend to fly upwards to surfaces, so sticky traps should be placed just above potential breeding sources with the sticky surface facing down.

11. Answer b) is correct. You would not install ultraviolet bulbs since these attract flies. UV bulbs are used in insect light traps.

    Answer a) is incorrect because installing and repairing screens with a small enough mesh is a good way to keep flies out. Answer c) is incorrect because the installation of air curtains or air doors over loading docks and other doorways also keeps flies from entering.

12. Answer c) is correct. Although you can't see the difference, the ultraviolet bulbs used in insect light traps begin to lose about 50% of their effectiveness after one year.

    Answer a) is incorrect because to trap flies, light traps should be installed low, no more than 4 to 6 feet above the floor. Answer b) is incorrect because there are sticky board traps as well as electrocuting traps, and also combinations of the two.

13. Answer b) is correct. This statement is false because fruit flies are not highly attracted to standard insect light traps. However, some ILTs are equipped with special lures for fruit flies. There are also disposable fruit fly traps and refillable traps that use a liquid or food attractant.

14. Answer a) is correct. This statement is true because flies are not able to compete with the wind generated by air doors and air curtains that are placed over doorways. Standard fans will also keep flies away from salad bars and other food areas needing protection.

    Answer b) is not true because house flies can be captured on various kinds of hanging sticky bars, tubes, or tapes. Answer c) is not true because using a sprayer filled with water, degreaser, and foamer is an effective way to control fruit flies around drink dispensers, drains, and kitchen equipment.

15. Answer c) is correct. Controlling the visible adult flies by spraying or trapping will not eliminate the fly problem. More flies will emerge on a daily basis unless the food source is found and eliminated.

    Answer a) is incorrect because a space treatment is used to kill remaining flies only after the breeding sources have been identified and removed. Answer b) is incorrect because installing insect light traps only harvests some of the adult flies. New flies will appear unless the food source is eliminated.

16. Answer b) is correct. This statement is false because some residual insecticides can be used in certain situations where they are away from people, food, and food surfaces, such as painted on window sills or applied to panels inside fly traps. Residual insecticides also have uses outside around dumpsters and trash areas.

4.4 COCKROACHES

1. Answer b) is correct. This statement is true because the four species of cockroaches that are the main problems in structures (German, American, oriental, and brown banded) can breed indoors if conditions are right.

    Answer a) is not true because there are thousands of species of cockroaches. Only a few of them are structural pests. Answer c) is not true because cockroaches generally hide during the day in cracks and crevices and actively feed at night.

2. Answer b) is correct. The German cockroach is the most successful and most important cockroach. It is completely adapted to living indoors with people and can utilize almost any indoor site.

    Answer a) is incorrect because the brownbanded cockroach tends to be more regional and has more limited environmental requirements than the German cockroach. Answer c) is incorrect because, in most areas, the oriental cockroach is an occasional invader and tends to be found around foundations and on the lowest level in buildings. It's not as common in living areas as the German cockroach.

3. Answer a) is correct. This statement is true because people that are frequently exposed to cockroaches can develop a sensitivity to cockroaches' shed skins, egg cases, and feces.

4. Answer c) is correct. Cockroaches like to travel along the edges of walls and objects so that they are near a crack that they can quickly dart into if threatened.

    Answer a) is incorrect because cockroaches prefer to take the long away around, hugging the perimeter, rather than crossing an open space. Answer b) is incorrect because cockroaches typically spend about 3/4 of their time hiding in cracks and crevices.

5. Answer b) is correct. This statement is true because cockroaches travel from their daytime hiding places to their regular feeding sites, usually at night.

    Answer a) is not true because cockroaches must be within a few inches of food before they realize it is there. Answer c) is not true because cockroaches can learn where food is usually found even if they can't detect its presence from a distance.

6. Answer a) is correct. This statement is true because the German cockroach female does retain her egg case until a day or two before it hatches. This provides extra protection for her offspring. Other cockroaches either drop or glue their egg case to surfaces shortly after it is formed.

7. Answer c) is correct. A German cockroach's egg case contains between 30 to 40 nymphs. The smaller the cockroach, the more nymphs in its egg case.

    Answer a) is incorrect because all cockroaches, regardless of size, have more than 6 developing nymphs in their egg cases. Answer b) is incorrect because 16 nymphs is the typical number found in the egg cases of the larger American and oriental cockroaches.

8. Answer b) is correct. The brownbanded cockroach prefers hotter and drier areas and has less need for water than the other pest cockroaches.

    Answer a) is incorrect because the German cockroach is most often found in kitchens and bathrooms where water is available. Answer c) is incorrect because the American cockroach likes warm, dark, damp areas where water is available.

9. Answer a) is correct. The oriental cockroach prefers cool, dark, damp, poorly ventilated areas such as cellars, basements, and crawlspaces. It is found around building foundations, and if it gets inside a building, it rarely is found above the lowest level.

    Answer b) is incorrect because German cockroaches like warmer, drier sites and can be found on all levels inside a building. Answer c) is incorrect because brownbanded cockroaches like hot, dry areas and have the least need for moisture of all the pest cockroaches.

10. Answer b) is correct. This statement is false because the German cockroach is the most common cockroach in food establishments. It has adapted to feed on all kinds of human foods and can live in virtually any indoor site. It also has a tremendous reproductive capability. The oriental cockroach is less adapted to living and reproducing in warmer, drier, indoor sites.

11. Answer a) is correct. The American cockroach prefers warm, dark, damp areas and is usually found in lower levels of a building in sites like boiler rooms, garbage rooms, or near steam pipes.

    Answer b) is incorrect because a crawlspace is a cooler low level space that is more suited to the oriental cockroach. Answer c) is incorrect because a bedroom is higher and drier and more suited to the brownbanded cockroach.

12. Answer c) is correct. Placing a trap in the middle of a kitchen shelf is not a good idea since cockroaches generally do not move across open spaces, they travel along edges.

    Answer a) is incorrect since placing a trap in the back corner of a cabinet would intercept more cockroaches as they like to hide in corners. Answer b) is incorrect since cockroaches like to move along edges of shelves and other surfaces, rather than out in the open.

13. Answer b) is correct. Outdoor cockroaches often hide in stacked materials so moving piles of firewood, stones, leaves, and other debris away from the building will help reduce the chances of cockroaches entering.

    Answer a) is incorrect because outdoor cockroaches often live in mulch. Mulch should be removed from the building foundation rather than added. Answer c) is incorrect because a drain trap should be screened and should be full of water so that cockroaches can not enter through the trap.

14. Answer b) is correct. This statement is false because vacuuming is a good pest control option and is especially useful as a control measure in accounts where insecticides are not a good choice. In addition to removing cockroaches, a vacuum with a HEPA filter will effectively remove some allergens such as cockroach egg cases, dead cockroaches, and fecal droppings.

15. Answer b) is correct. This statement is true because food carts, tray carts, drains, trash rooms, trash cans, dumpsters, compactors, and loading docks are just some of the sites that should be regularly cleaned and degreased in commercial accounts.

    Answer a) is not true because power-washing can be used in some indoor locations such as kitchens and trash rooms. Answer c) is not true because degreasing chemicals combined with foaming agents are a good cleaning method for drains, equipments, and trash receptacles.

16. Answer b) is correct. This statement is false because fogging, also called a space treatment, does not effectively penetrate into cracks and crevices where cockroaches hide. A crack and crevice treatment with sprays, dusts, or baits is the most effective way to control cockroaches indoors.

17. Answer a) is correct. This statement is not true because cockroaches can be controlled indoors with gel baits, paste baits, containerized baits, and granular baits.

    Answer b) is true because some baits can last as long as six months. However humidity, dust, grease, and other conditions can affect their palatability to cockroaches. Answer c) is true because granular cockroach baits can be placed outdoors inside bait stations.

18. Answer a) is correct. This statement is true because insect growth regulators (IGRs) can usually be tank-mixed with residual insecticides used for cockroach control, or used along with cockroach baits. They provide an extra measure of control in heavy infestations.

19. Answer c) is correct. Since most outdoor cockroaches live at ground level around the foundation of a building, treating at attic level would have little effect. Instead, treating the lower portion of outside walls would intercept them before they could reach upper levels.

    Answer a) is incorrect because a coarse spray applied to mulch, soil, low vegetation, and lower portions of outside walls is an effective treatment for outside cockroaches. Answer b) is incorrect because treating around door thresholds, windows, openings around utility conduits, and other potential entry points is a good way to prevent cockroaches from entering a building.

4.5 BED BUGS

1) Answer b) is the correct answer because it is false. Small bed bug nymphs feed only on blood. Answer a) is incorrect because it is true that bed nymphs must feed on blood before they can molt. Answer c) is incorrect because while bed bugs can feed on all kinds of vertebrates, they prefer humans.

2) Answer c) is correct. Bed bugs can survive for months, and in some cases more than a year, without feeding, such as when housing becomes vacant. Answer a) is incorrect because bed bugs may travel 20 feet or more to feed, although they prefer to be closer. Answer b) is incorrect because bed bugs typically prefer to feed every few days up to once a week.

3) Answer a) is correct because it is true that bed bugs feed mostly between midnight and just before dawn (although in rare instances they will even feed in the daytime).

4) Answer a) is correct because a kitchen cabinet is not a common site for bed bugs, which are typically found close to sleeping areas. Answers b) and c) are incorrect because both are typical harborage sites for bed bugs.

5) Answer a) is correct. It is true that bed bugs are primarily found close to sleeping areas.

6) Answer b) is correct because it is false that bed bugs always move to new locations by hitchhiking. They also move to new sites by actively walking on their own 6 feet.

7) Answer b) is correct because it is a false statement: no stage of bed bug has wings. All are wingless, although adults have wing buds. Answer a) is incorrect because it is true that bed bugs are broadly oval. Answer c) is incorrect because it is true that adults are about 1/4-inch long.

8) Answer a) is correct because it is a false statement. Bed bugs are NOT known to transmit any diseases. Answer b) is incorrect because it is true that some people do not react to bed bug bites (particularly if they have never been bitten by a bed bug before). Answer c) is incorrect because it is true that most bite reactions are very similar to a mosquito bite.

9) Answer a) is correct because it is true that the only way to confirm a bite was caused by a bed bug is to find evidence of a bed bug infestation. A bed bug bite looks very much the same as other bites and skin conditions.

10) Answer c) is correct. Wings on a windowsill are not a sign of bed bugs mainly because bed bugs do not have wings. Answers a) and b) are incorrect because both viable bed bug eggs and blood spotting are valid signs of bed bugs.

11) Answer a) is correct. A bite does not confirm bed bugs because bed bug bites are indistinguishable from other insect bites, other arthropod bites, and various skin conditions, diseases, reactions. Answers b) and c) are incorrect because both live bed bugs and viable eggs are signs of bed bug infestation.

12) Answer c) is correct because the statement is false: adjacent rooms to inspect also includes those above and below. Answer a) is incorrect because it is true that rooms and apartments next to infested rooms have a higher risk of having bed bugs. Answer b) is incorrect because it is true that bed bugs could have spread to adjacent rooms or the adjacent rooms could be the source of the infestation.

13) Answer b) is correct. Cooperation from all concerned is essential for success. Cooperation includes preparation for service, access to treatment and inspection of areas, instituting changes, etc. Answer a) is incorrect because vacuuming is a supplemental service that can help in control, but is not the core of the program. Answer c) is incorrect because it typically takes 2, 3, or more services to successfully control bed bugs.

14) Answer a) is correct. Targeted vacuuming is an excellent way to quickly eliminate clumps of bed bugs in heavy infestations.

15) Answer c) is correct because a vacuum can, in fact, carry bed bugs to new sites if you are not careful. Answer a) is incorrect because a crevice tool is a useful accessory for vacuuming bed bug in corners, cracks, and crevices. Answer b) is incorrect because a HEPA filter can minimize the risk of airborne allergens.

16) Answer a) is correct. It is true that steam treatments can reduce the amount of insecticide needed to control bed bugs at a site. Steam enables a technician to kill bed bugs in sensitive areas that people contact regularly such as upholstered furniture, mattresses, and bed springs, minimizing the amount of insecticide that needs to be applied.

17) Answer a) is correct. Many surfaces can be damaged by steam, such as veneers, painted surfaces, plastics, electronics, wallpaper, and anything glued. Answer b) is incorrect because fecal spotting, eggs, or live bed bugs indicate harborage sites where there are bed bugs. Answer c) is incorrect because the kill rate and penetration of steam increases the slower you move the steamer head across a surface.

18) Answer b) is correct. Heat treatment is often supplemented with insecticide application (especially in wall voids) both to treat heat resistant areas and to provide a residual effect.

19) Answer c) is correct. Encasements actually make inspections easier because bed bugs are unable to get inside mattresses and box springs where they are tough to find. Answer a) is incorrect because encasements eliminate the need to treat mattresses and box springs. Answer b) is incorrect because there is no need to discard an infested mattress or box spring if the bed bugs, eggs, and odor are trapped inside.

20) Answer b) is correct. Because of the amount of insecticides sometimes applied and the repeated treatments there are serious concerns over potential overexposure to occupants. Also, bed bugs are not easy to kill with insecticides for a number of reasons having to do with toxicology and behavior. Answer a) is incorrect because treatments should only be made in areas where bed bugs are confirmed or suspected or typically found, mostly close to sleeping areas. Answer c) is incorrect because targeted application of small amounts of insecticide along with other nonchemical measures is the most effective way to control bed bugs.

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