Reading Hospital School of Health Sciences
Medical Imaging Program

MI132 – Imaging Principles and Equipment
Unit 1 Study Guide
2022-2023

This study guide is recommended to be completed but is not required. If you want faculty to review your answers, please submit to Course Faculty (Stacy Oskam) via e-mail. This must occur by 12:00 PM the day prior to the exam.

1. List the three fundamental particles along with their corresponding charges.

2. What is the distinguishing characteristic of an element?

3. What formula is used to calculate the maximum number of electrons in each orbital shell?

4. How many electrons can exist in the outermost shell?

5. What is the maximum number of electrons that can exist in the N shell?

6. List and explain the two things that affect the binding energy of an electron.

7. What is the difference between a neutral atom and an ion?

8. Define atomic number and the atomic mass number?

9. Identify the Z number for each of the following atoms:

    a. Helium

    b. Lead

    c. Barium

    d. Calcium

    e. Oxygen

10. The rows on the periodic table of elements are referred to as _____. Each one indicates _____.

11. The columns on the periodic table of elements are referred to as _____. Each one indicates _____.

12. The number of waves that pass a particular point within a given time frame is referred to as _____. This is generally expressed in the unit of _____.

13. What is the velocity of all types of electromagnetic energy?

14. What is the formula best known as the electromagnetic wave formula?

15. Describe the relationship between:

    a. Photon energy and frequency

    b. Photon energy and wavelength

    c. Wavelength and frequency

16. What is the formula best known as Planck's formula?

17. What is the wavelength range (in Angstroms) of diagnostic x-rays?

18. What is the difference between ionization and excitation?

19. Rank in order the following types of electromagnetic energy according to their energy using #1 for the one with the most energy and #7 for the one with the least energy.

_____ visible light

_____ x-rays

_____ ultraviolet light

_____ infrared light

_____ radiofrequency

_____ microwaves

_____ gamma rays

20. Of the types of EMR listed above, which are capable of causing ionizations?

21. What is meant by the wave-particle duality of electromagnetic radiation?

22. Which members of the EMR spectrum act more like particles versus waves?

23. What is the difference between x-rays and gamma rays?

24. List and explain the properties of x-rays.