EC 5143, Managerial Economic Analysis
Homework 1: Fundamentals of Managerial Economics

Section A (36 points)

[Each of the multiple-choice questions is worth 2 points]

1. The higher the interest rate:
A. the greater the present value of a future amount.
B. the smaller the present value of a future amount.
C. the greater the level of inflation.
D. None of the statements associated with this question are correct.

2. Economic profits are:
A. total revenue minus total explicit cost.
B. marginal revenue minus marginal cost.
C. total revenue minus total opportunity cost.
D. total profits of the economy as a whole.

3. Which of the following is an implicit cost of going to college?
A. Tuition
B. Cost of books and supplies
C. Room and board
D. Foregone wages

4. The primary inducement for new firms to enter an industry is:
A. increased technology.
B. availability of labor.
C. low capital costs.
D. presence of economic profits.

5. If the interest rate is 5 percent, the present value of $200 received at the end of five years is:
A. $121.34.
B. $156.71.
C. $176.41.
D. $132.62.

6. To maximize profits, a firm should continue to increase production of a good until:
A. total revenue equals total cost.
B. profits are zero.
C. marginal revenue equals marginal cost.
D. average cost equals average revenue.

7. A farm must decide whether or not to purchase a new tractor. The tractor will reduce costs by $2,000 in the first year, $2,500 in the second, and $3,000 in the third and final year of usefulness. The tractor costs $9,000 today, while the above cost savings will be realized at the end of each year. If the interest rate is 7 percent, what is the net present value of purchasing the tractor?
A. $6,764
B. $9,362
C. $18,362
D. None of the statements associated with this question are correct.

8. Suppose the growth rate of the firm's profit is 5 percent, the interest rate is 6 percent, and the current profits of the firm are $80 million. What is the value of the firm?
A. $89.2 million
B. $1,413.3 million
C. $8,480 million
D. None of the statements associated with this question are correct.

9. Marginal benefit refers to:
A. the average benefits that arise by using an additional unit of the managerial control variables.
B. the additional benefits that arise by using an additional unit of the managerial control variables.
C. the change in average benefits arising from a change in the control variable.
D. None of the statements associated with this question are correct.

10. If the interest rate is 5 percent and cash flows are $3,000 at the end of year one and $5,000 at the end of year two, then the present value of these cash flows is:
A. $7,392.29.
B. $8,400.34.
C. $4,222.50.
D. $400.74.

11. If the interest rate is 7 percent, $500 received at the end of nine years is worth how much today?
 A. $500/ (0.07)^9$
B. $500/ (1 + .07)^9$
C. $500/ (1 + 7)^9$
D. 500

12. What is the net benefit associated with producing two units of the control variable, Q (identify point C in the table)?

Control Variable Q	Total Benefits B(Q)	Total Costs C(Q)	Net Benefits N(Q)	Marginal Benefit MB(Q)	Marginal Cost MC(Q)	Marginal Net Benefit MNB(Q)
0	0	0	0	--	--	--
1	900	100	800	900	100	800
2	1,700	300	C	800	200	600
3	2,400	600	1,800	700	E	400
4	A	1,000	2,000	600	400	200
5	3,500	1,500	2,000	500	500	F
6	3,900	2,100	1,800	D	600	-200
7	4,200	2,800	1,400	300	700	-400
8	4,400	B	800	200	800	-600
9	4,500	4,500	0	100	900	-800
10	4,500	5,500	-1,000	0	1,000	-1000

A. 600
B. 800
C. 1,200
D. 1,400

13. To maximize net benefits in the table, it is most appropriate to use:

Control Variable Q	Total Benefits B(Q)	Total Costs C(Q)	Net Benefits N(Q)	Marginal Benefit MB(Q)	Marginal Cost MC(Q)	Marginal Net Benefit MNB(Q)
0	0	0	0	--	--	--
1	900	100	800	900	100	800
2	1,700	300	C	800	200	600
3	2,400	600	1,800	700	E	400
4	A	1,000	2,000	600	400	200
5	3,500	1,500	2,000	500	500	F
6	3,900	2,100	1,800	D	600	-200
7	4,200	2,800	1,400	300	700	-400
8	4,400	B	800	200	800	-600
9	4,500	4,500	0	100	900	-800

10	4,500	5,500	-1,000	0	1,000	-1000

A. four units of the control variable, since the marginal benefit exceeds marginal cost.
B. six units of the control variable, since the marginal cost exceeds marginal benefit.
C. five units of the control variable, since net marginal benefits are zero.
D. None of the statements associated with this question are correct.

14. Compute the present value of a preferred stock that pays, in perpetuity, an annual cash flow of $200 at an annual interest rate of 5 percent.
A. $190.48
B. $210
C. $4,000
D. $4,200

15. What is the level of net benefits when 20 units are produced?

No. Units Produced	Total Revenue	Total Costs
0	0	0
10	120	40
20	200	100
30	270	170
40	310	260
50	330	370

A. -100
B. 80
C. 100
D. 10

16. What is the marginal revenue of producing the third unit?

No. Units Produced	Total Revenue	Total Costs
0	0	0
1	100	50
2	180	110
3	250	180

4	290	270
5	310	380

A. 250
<mark>B. 70</mark>
C. 0
D. 90

17. What is the marginal cost of producing the fifth unit?

No. Units Produced	Total Revenue	Total Costs
0	0	0
1	100	50
2	180	110
3	250	180
4	290	270
5	310	380

A. 270
<mark>B. 110</mark>
C. 50
D. 0

18. What is the level of net benefits when four units are produced?

No. Units Produced	Total Revenue	Total Costs
0	0	0
1	100	50
2	180	110
3	250	180
4	290	270
5	310	380

A. 0
B. 70
C. -70
D. 20

Section 2 (34 points)

19) What is the maximum you would pay for an asset that generates an income of $200,000 at the end of each of the five years if the opportunity cost of using the funds is 5%? **(5 points)**

$200,000/1.05+200,000/1.05^2+200,000/1.05^3+200,000/1.05^4+200,000/1.05^5= 1000$

20) Jane spends $40,000 per year on painting supplies and storage space. She recently received two job offers from a famous marketing firm-one offer for $120,000 and another offer for $110,000. However, she turned both jobs down to continue a painting career. If Jane sells 30 paintings per year at $7,500 each:

   a) What are her accounting profits? **(4 points)**
      7,500*30= 225,000
      225,000-40,000= 185,000
      Accounting profits= 185,000

   b) What are her economic profits? **(3 points)**
      Total revenue= 225,000
      Emplict cost= 40,000

Implicit cost=120,000
225,000-40,000-120,000= 65,000
Economic profit= 65,000

21) What is the value of a preferred stock that pays a perpetual dividend of $100 at the end of each year when the interest rate is 4%?   **(5 points)**
4=100/value*100
Value=10000/4
= 2,500

22) Suppose the total cost from a continuous activity are, respectively, given by the following equations: $B(Q)=100+36Q-4Q^2$ and $C(Q)=80+12Q$. [Note: $MB(Q)=36-8Q$ and $MC(Q)=12$]

   a) Write down the equation for net benefits.**(2 points)**
       N(Q)=B(Q)-C(Q)

b) What are the net benefits when Q=1? Q=5?**(3 points)**
N(Q)= 20+24Q-4Q^2
20+{(24*1)-(4*(1)}
20+24-4
=40

20+{(24*5)-(4*(5)^2}
20+120-(4*25)
140-100
=40

c) Write out the equation for the marginal net benefits.**(3 points)**
MNB(Q)=MB(Q)-MC(Q)
MB(Q)=36-8Q
MC(Q)=12
36-8Q-12
36-12-8Q
24-8Q
MNB(Q)=24-8Q

d) What are the marginal net benefits when Q=1? Q=5?**(3 points)**
24-8Q
24-(8*1)
24-8
=16

24-(8*5)
24-40
=-16

e) What level of Q maximizes net benefits?**(3 points)**
MB(Q)=MC(Q)
36-8Q=12
8Q=36-12
8Q=24
Q=3

f) At the level of Q that maximizes net benefits, what is the value of marginal net benefit?**(3 points)**
MNB(Q) =MB(Q)-MC(Q)
36-8Q-12
36-12-8Q
24-8Q
=3
MNB(Q)=24-8Q
=24-(8X3)
24-24
0