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Economics 201

Midterm #2: Questions and Solutions

Exam Solutions: *The multiple choice answers are given in boldfaced print and the short answer question answers are given below each question.*

Part 1. Multiple Choice Questions (2 points each question)

1. One advantage of forming a corporation is:
a. unlike partnerships, corporations can raise money by borrowing from financial institutions
b. the owners of a corporation have limited liability
c. corporations tend to have lower bureaucratic costs than sole proprietorships
d. corporations are better able to utilize work and risk sharing arrangements than partnerships
e. all of the above

2. Which firm type is characterized by the separation of owners and operators (i.e. managers):
a. sole proprietorship
b. partnership
c. corporation
d. all of the above

3. When Ford commits to purchasing "specialized resources", what happens?
a. there is a switching cost that results directly from making this decision
b. the opportunity cost of purchasing this equipment is too high
c. the firm will increase its marginal cost
d. Ford will increase the price of cars

4. When writing out a contract, is it possible to plan for every contingency?
a. No, because high production costs prevent firms from planning
b. Yes, because contracts can be long or short
c. No, because gathering that kind of information is too costly
d. Yes, because firms are typically very efficient at monitoring their contracts

5. What is the best explanation, advanced in lecture, for why firms exist?
a. creating a firm minimizes labor costs
b. creating a firm minimizes the cost of capital
c. creating a firm minimizes the cost of land
d. creating a firm minimizes transactions costs
e. creating a firm minimizes input costs

6. The Law of Diminishing Returns states that as increasing amounts of a variable factor are combined with a fixed factor:
a. output will begin to decrease
b. a firm will shift from small changes in output to larger changes in output
c. a firm will eventually experience smaller increases in output
d. all of the above

7. When comparing product and cost curves, which statement is correct:
a. when a product curve is rising, it's related cost curve is rising
b. product curves give us information about diminishing returns, cost curves do not
c. if marginal product and average product intersect at the point where marginal product is at a maximum, then so do marginal cost and average cost
d. product curves are inverse mirror images of the cost curves

Questions #8-10 correspond with the following production function for a specific firm that uses capital and labor in the production of good X.

$Q = 10\sqrt{L \cdot K}$ (where Q = output, L = labor, K = capital)

assume that K is fixed (constant) at 100.

8. Rounded to the nearest tenth, what is the average product of labor (APL) when L = 100
a. 10.0
b. 1,000.0
c. 0.1
d. 5.0
e. none of the above

9. Rounded to the nearest tenth, what is the marginal product of labor (MPL) when L increases from 100 units to 101 units
a. 10.0
b. 1,000.0
c. 0.1
d. 5.0
e. none of the above

10. If MPL = 2.5 when L = 400, then which of the following statements is true about APL:
a. APL is increasing
b. APL is equal to MPL
c. APL is decreasing
d. APL is at a maximum

11. Which of the following statements about average fixed cost (AFC) is always true:
a. AFC increases as output increases
b. AFC decreases as output increases
c. AFC is always less than average variable cost
d. AFC is always less than marginal cost

The equations below should be used with Questions #12-19 and correspond with a profit maximizing perfectly competitive firm (i.e. where q = output).

$TC = \$170$	if $q = 0$
$TC = 200 + 10q + q^2$	if $q > 0$
$MC = 10 + 2q$	if $q > 0$

12. If q = 100, then what is the firm's average cost (AC)?
a. $11,200
b. $112
c. $110
d. $2
e. none of the above

13. If q = 100, then what is the firm's average variable cost (AVC)?
a. $11,200
b. $112
c. $110
d. $2
e. none of the above

14. If q = 100, then what is the firm's average fixed cost (AFC)?
a. $11,200
b. $112
c. $110
d. $2
e. none of the above

15. What are the firm's sunk costs?
a. $200
b. $170
c. $30
d. $1.70
e. none of the above

16. What are the firm's recoverable fixed costs?
a. $200
b. $170
c. $30
d. $3
e. none of the above

17. If the market price is $50 (i.e. P = $50), then what is the firm's total variable cost (TVC)?
a. $600
b. $200
c. $50
d. $0
e. none of the above

18. If the market price is $20 (i.e. P = $20), then what is the firm's total cost (TC)?
a. $40
b. $55
c. $445
d. $275
e. none of the above

19. What are the profits when this firm produces where MC equals AC?
a. - $1500
b. $0
c. $23.33
d. $1510
e. none of the above

20. Which of the following is always a true statement:
a. AFC = TC - TVC
b. TFC = TR - TC (where TR = total revenue)
c. TVC = TC + TFC
d. AC = AFC + AVC

21. Over the long run, which of the following will correspond with increasing costs:
a. economies of scale
b. diseconomies of scale
c. constant returns to scale
d. none of the above

22. If a firm doubles in size (scale) but needs less than twice as many workers, then:
a. the firm experiences decreasing returns to scale
b. the firm experiences increasing costs
c. the firm experiences increasing returns to scale
d. the firm experiences constant returns to scale
e. none of the above

23. Which statement about economic profit is true:
a. economic profit is always less than accounting profit
b. a firm will never produce when economic profit is less than zero
c. economic profit minus a firm's opportunity costs is equal to accounting profit
d. economic profit represents the overall amount of money a firm earns in a given period

24. Which of the following characteristics implies that all perfectly competitive firms will sell their output at the same price?
a. firms are all small producers
b. firms are able to borrow all the money they need to purchase capital
c. there are many firms in the market
d. homogeneous products
e. firms have no barriers to entry or exit

25. Falling marginal costs correspond with
a. falling average product
b. rising average costs
c. rising average variable costs
d. increasing marginal product

26. When a firm decides on how many laborers to hire, how does the firm arrive at that choice?
a. the firm will hire laborers until the cost of each laborer is equal to the price of what the firm sells
b. the firm will hire laborers until the marginal benefit of hiring labor is equal to the wage
c. the firm will hire laborers until the firm's profits are equal to zero
d. the firm will hire laborers until the firm is producing maximum output
e. the firm will hire laborers until the firm is maximizing the marginal product of labor

27. If a perfectly competitive firm earns positive profits in the short run and this is expected to remain unchanged into the long run, then:
a. existing firms will exit the market in the long run
b. new firms will enter the market in the long run
c. the profits of existing firms will increase even more in the long run
d. existing firms will make eventually make losses in the long run
e. existing firms will experience increasing costs

28. Assuming that existing firms do not change their scale of operations, what happens in the long run when P > AC for each firm and demand is expected to remain unchanged:
a. market supply will increase
b. market supply will decrease
c. each firm's demand will increase
d. each firm's demand will decrease
e. both a and d are correct

29. What purpose do MC and AC serve when we study perfectly competitive firms?
a. MC helps us find the profit maximizing level of output, AC the level of profits
b. MC helps us find out if profits are positive or negative, AC the level of output
c. MC and AC are used together to help us determine the level of output
d. MC tells us if the firm has any sunk costs, and AC tells us the level of output
e. MC tells us if the firm will shut down, AC tells us if the firm will produce

30. What happens if a perfectly competitive firm earns a loss that is larger than its total fixed cost?
a. the firm will exit the industry in the short run
b. the firm will shut down in the short run and wait for prices to rise
c. the firm will produce in the short run and earn negative profit
d. each firm will lower its price in the short run
e. all of the above

31. A perfectly competitive firm's demand curve _____.
a. is negatively sloped
b. is positively sloped
c. is a horizontal line at the market price
d. always intersects the AC curve
e. both c and d are true

32. Which of the following industries is closest to perfect competition:
a. where there are many, small firms producing identical products
b. where there are several firms, producing identical products
c. where there are many firms, each of which can set its own price
d. where there are several small firms, and the price of their products is the same

33. Which of the following imply that firms will earn zero economic profit in the long run
a. when each firm produces homogeneous products
b. when there are no entry or exit barriers associated with the industry
c. when each firm charges the same price as its competitors
d. when there are many small firms in the market
e. when there are more consumers than firms in the market

34. In a market with increasing costs in the long run, what happens as demand increases over time?
a. prices in the market tend to decrease
b. prices in the market will remain the same
c. prices in the market tend to rise
d. profits in the market tend to decrease
e. both c and d are correct

35. Assume good X is sold in a perfectly competitive market where firms are all earning negative economic profit. In the context of the long run, what does this imply about the market?
a. firms are producing at a price that is too high, relative to what the market believes is correct
b. low demand will lead these firms to experience surpluses
c. firms are ready to exit if there are decreasing returns and enter if there are increasing returns
d. each firm has an increased incentive to lower its price below their competitors
e. the market demand and market supply curves intersect below the long run supply curve

Questions #36-40 correspond with the table on the next page (Table 1).

36. Where do we observe diminishing marginal returns on this table (if at all)?
a. in the rows where the firm's profits are negative
b. in the rows where the firm's profit is equal to zero
c. in the rows where the firm's profits are positive
d. all of the above
e. none of the above

37. What is the sunk cost of this firm?
a. $10
b. $2
c. $200
d. $100
e. none of the above

38. What are the recoverable fixed costs of this firm?
a. $10
b. $2
c. $200
d. $100
e. none of the above

39. What is the greatest possible profit for this firm when the firm produces 10 units
a. $100
b. $300
c. $400
d. $500
e. none of the above

40. What is the greatest possible profit for this firm if the market price is set at $42
a. $28
b. $336
c. -$266
d. -$100
e. none of the above

*Table 1 (below) should be **used to answer questions #36-40** on the previous page. The table corresponds with the output and costs of a profit maximizing, perfectly competitive firm. Note that **you will also use this table with short answer section Question #5** (last page).*

Table 1

Output	TC	AC	MC	AVC
0	$ 100.00	-	-	-
1	$ 112.00	$ 112.00	$ 14.00	$ 12.00
2	$ 128.00	$ 64.00	$ 18.00	$ 14.00
3	$ 148.00	$ 49.33	$ 22.00	$ 16.00
4	$ 172.00	$ 43.00	$ 26.00	$ 18.00
5	$ 200.00	$ 40.00	$ 30.00	$ 20.00
6	$ 232.00	$ 38.67	$ 34.00	$ 22.00
7	$ 268.00	$ 38.29	$ 38.00	$ 24.00
8	$ 308.00	$ 38.50	$ 42.00	$ 26.00
9	$ 352.00	$ 39.11	$ 46.00	$ 28.00
10	$ 400.00	$ 40.00	$ 50.00	$ 30.00
11	$ 452.00	$ 41.09	$ 54.00	$ 32.00
12	$ 508.00	$ 42.33	$ 58.00	$ 34.00
13	$ 568.00	$ 43.69	$ 62.00	$ 36.00
14	$ 632.00	$ 45.14	$ 66.00	$ 38.00
15	$ 700.00	$ 46.67	$ 70.00	$ 40.00
16	$ 772.00	$ 48.25	$ 74.00	$ 42.00
17	$ 848.00	$ 49.88	$ 78.00	$ 44.00
18	$ 928.00	$ 51.56	$ 82.00	$ 46.00
19	$ 1,012.00	$ 53.26	$ 86.00	$ 48.00
20	$ 1,100.00	$ 55.00	$ 90.00	$ 50.00

Note that:
TC = Total Cost
AC = Average Cost
MC = Marginal Cost
AVC = Average Variable Cost

Part 2. Short Answer Section (20 points overall)

Credit for these problems will come from not only showing you know the correct answer but also that you show any relevant work, or make it very clear as to how you got your answer. No supporting work and just an answer will get no credit, whether the actual answer is correct or not.

Assume the equations below correspond with a profit maximizing, perfectly competitive firm. Use these equations to answer questions #1-4. Note that question #5 uses table 1 on the previous page.

$TC = \$350$	if $q = 0$
$TC = 500 + 10q + 4q^2$	if $q > 0$
$MC = 10 + 8q$	if $q > 0$

[4 pts] *1. If the firm is currently producing 20 units of output, then what are the firm's greatest possible profits?*

When the firm produces any amount of output, the firm will produce where P = MC. Therefore, the price must be \$170. With this in mind, we can calculate profit.

Profits are: $\pi = (\$170 \times 20) - \$2300 = \$1100$

[4 pts] *2. Assume all you know is that this profit maximizing firm has an average variable cost of \$50. Based on what you know about a firm like this, in terms of how the firm behaves, what must be the firm's current profit?*

If AVC = \$50, then we can solve for output by setting what we know to be AVC equal to \$50.

$10 + 4q = 50$

$q = 10$

Once we know that the firm is producing 10 units, we follow the process outlined above in question #1 and get a price of \$90.

Profits are: $\pi = (\$90 \times 10) - \$1000 = -\$100$

[4 pts] *3. If the market price is currently \$106 (i.e. P = 106), then what would be the firm's greatest possible profits?*

If the firm produces where P = MC and P = 106, then MC = 106. This would imply that q = 12. With this in mind, we can calculate profit.

Profits are: $\pi = (\$106 \times 12) - \$1196 = \$76$

Part 2. Short Answer Section cont.

[4 pts] *4. If the market price falls to $50 (i.e. P = 50), then what would be the firm's greatest possible profits?*

If the firm produces where P = MC and P = 50, then MC = 50 and q = 5. With this in mind, we can calculate profit from producing those 5 units.

Profits are: π = ($50 x 5) – $650 = -$400

With the firm earning a loss, it's necessary to consider shutting down. If the firm shuts down, then the firm will pay its sunk cost – which represents the (negative) profit from shutting down.

Profits are: π = ($50 x 0) – $350 = -$350

It is better to shut down, so the greatest possible profit in this situation is a loss of $350.

Question #5 utilizes Table 1, the same table you use to answer multiple choice questions #36-40. Note that your answer to this question (below) involves a discussion, not a calculation, and if you cannot find a specific row on the table, then you may discuss the area of the table where this point should exist. You may utilize a graph within your answer as well.

[4 pts] *5. Define the breakeven point and, on Table 1, determine where the breakeven point is located? Explain.*

The breakeven point is the point where economic profit would be equal to zero and is located where AC = MC. Using the marginal-average rule, we know that AC is at a minimum when AC = MC, and that this is the breakeven point. We also know that to the left of the breakeven point, AC > MC, and to the right of the breakeven point, AC < MC.

With this in mind, the breakeven point would exist somewhere between output of 7 and 8 units.