

NATIONAL UNIVERSITY OF SINGAPORE

**EC2101 MICROECONOMIC ANALYSIS I**

(SEMESTER II : AY2005-2006)

Time Allowed : 2 Hours

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**INSTRUCTIONS TO CANDIDATES**

1. This examination paper contains two sections and comprises EIGHTEEN (18) printed pages, including this page.
2. **Section A** contains TWENTY (20) multiple-choice questions. Each question carries one mark. Please **shade your answers on the bubble form provided**. The total mark for this section is TWENTY (20).
3. **Section B** contains FOUR (4) short-answer questions. The number of marks for each part of a question is specified at the end of each question. Please attempt ALL questions. **Write your answers clearly within the space provided in this booklet**. The total mark for this section is FORTY (40).
4. The total mark for this examination is SIXTY (60).
5. Please **write and shade** your matriculation number on the **bubble form** provided.
6. Please write your matriculation number in the space below.

Matriculation No:

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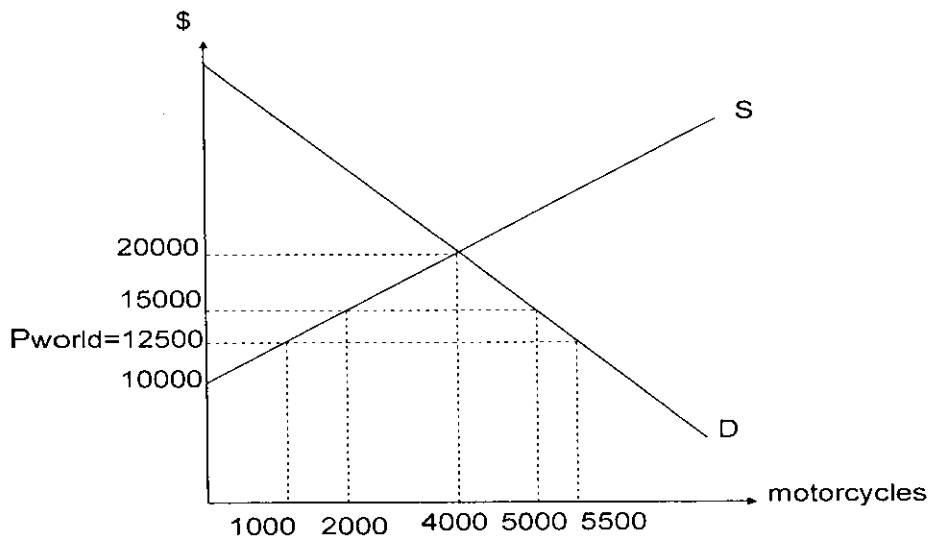
**THIS IS A CLOSED-BOOK EXAMINATION.**

**Section A: Multiple-Choice Questions**

This section contains TWENTY (20) multiple-choice questions. Each question carries ONE (1) mark. For each question, choose the correct answer, and shade the letter of your choice on the bubble form provided.

1. Price ceilings can result in a net loss in consumer surplus when the \_\_\_\_\_ curve is \_\_\_\_\_.
  - a. demand; very elastic
  - b. demand; very inelastic
  - c. supply; very inelastic
  - d. None of the above; price ceilings always increase consumer surplus.
  
2. Consider the following statements when answering this question:
  - I. Waiting lists for kidney transplants are caused by laws forbidding the sale of kidneys.
  - II. Policies prohibiting stem cell research could lead to deadweight loss.
    - a. I and II are true.
    - b. I is true, and II is false.
    - c. I is false, and II is true.
    - d. I and II are false.
  
3. The price elasticity of demand is -1.5. The price elasticity of supply is 1.5. The fraction of a specific tax that is borne by producers is:
  - a. 0
  - b. 0.25
  - c. 0.5
  - d. 0.75

4. The following question refers to the figure below.



Suppose an import quota of 3,000 motorcycles is imposed. If the government wanted to cut off international trade without removing the quota, it could allow the quota amount of 3,000 motorcycles in at no tariff and then charge a tariff on all imports above the quota amount. What tariff would accomplish the goal?

- a. \$0
  - b. \$5,000
  - c. \$7,500
  - d. \$20,000
5. A monopolist has set the level of output to maximize profit. The firm's marginal revenue is \$20, and the price elasticity of demand is -2.0. The firm's profit-maximizing price is approximately:
- a. \$0
  - b. \$10
  - c. \$20
  - d. \$40

6. A monopolist faces the following demand curve and total cost curve for its product:

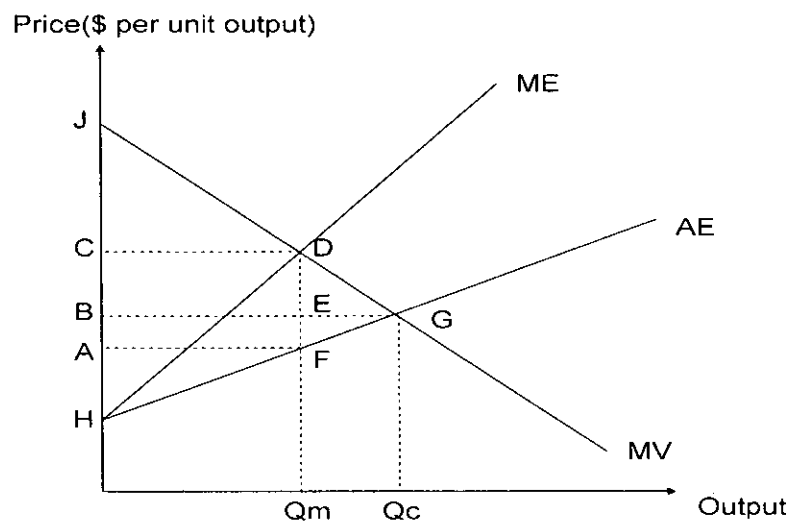
$$Q = 240 - 4P$$

$$TC = 10Q$$

Suppose that a tax of \$5 for each unit is imposed by the government. How much profit does the monopolist earn?

- a. \$4,050
- b. \$2,475
- c. \$2,025
- d. \$1,450

7. The following question refers to the figure below.



The figure shows the marginal value and expenditure curves for a monopsony. In moving from the competitive price and quantity to the monopsony price and quantity, the consumer surplus resulting from monopsony power is the area:

- a. ACDF
- b. BJDE
- c. HBEF
- d. AJDF

8. The demand for tickets (Q) to the backStreetboys concert in the indoor stadium is given as follows:

$$Q = 120,000 - 2,000P$$

The indoor stadium holds 60,000 people. The marginal cost of each concert goer is essentially zero up to 60,000 fans, but becomes infinite beyond that point. What are the profit-maximizing number of tickets sold and the price of tickets?

- a. 10,000; \$60
  - b. 20,000; \$50
  - c. 40,000; \$40
  - d. 60,000; \$30
9. A third-degree price discriminating monopolist can sell its output either in the local market or on eBay, an internet auction site, or both. Having sold all its output, it discovers that the marginal revenue in the local market is \$20, while its marginal revenue on eBay is \$30. To maximize profits the firm should
- a. have sold more output in the local market and less on eBay.
  - b. have sold less output in the local market and more on eBay.
  - c. sell less in both markets until marginal revenue is zero.
  - d. sell more in both markets until marginal cost is zero.
10. The McDonald's restaurant located near CHIJ St. Nicholas Girls' School in Ang Mo Kio has a Tuesday special for students. If the students showed their student ID cards, they would be given 50 cents off any special meal. This practice is an example of:
- a. first-degree price discrimination
  - b. third-degree price discrimination
  - c. inter-temporal price discrimination
  - d. a two-part tariff

11. Suppose Super Computing has a virtual monopoly in the ultra high speed computer market. Recently, it introduced a new computer that will be used by satellite installations around the world. The installations have identical demands for computers. Super Computing has decided to lease rather than sell the computer. The firm estimates the demand curve for each potential user as

$$P = 45 - 0.025Q$$

where  $P$  is the price per hour of computer time, and  $Q$  is the number of hours of computer time leased per month. The marginal cost of maintenance is estimated to be \$30 per computer hour. Assuming that Super Computing uses a two-part tariff, what "access charge" and hourly rental fee should the firm set?

- a. "access charge" = \$4,500 and hourly rental fee = \$30
  - b. "access charge" = \$11,250 and hourly rental fee = \$37.50
  - c. "access charge" = \$0 and hourly rental fee = \$600
  - d. "access charge" = \$22,500 and hourly rental fee = \$0
12. Suppose broadband service in the local market is supplied only by Singapore Broadband Network (SBN). The demand is  $Q = 6,500 - 100P$ , and SBN's marginal cost function is  $MC = 6.67 + 0.0067Q$ . If SBN can practise first-degree price discrimination, what is the producer surplus resulting from SBN's use of its market power?
- a. \$105,028.80
  - b. \$101,867.80
  - c. \$61,001.93
  - d. \$40,865.88
13. Suppose a new source of spring water is discovered in Seletar and the spring water can be produced at no cost. The demand curve for spring water is given as  $Q = 6,000 - 5P$ . What will be the price in the long run if the industry is a Cournot duopoly?
- a. \$400
  - b. \$600
  - c. \$800
  - d. \$900

14. Relative to a Nash equilibrium in the Cournot model, the Nash equilibrium in the Bertrand model with homogenous products
- results in the same output but a higher price.
  - results in the same output but a lower price.
  - results in a larger output but a lower price.
  - results in a smaller output but a higher price.
15. Use the following two statements about monopolistic competition to answer this question:
- In the long run, the price of the good will equal the minimum of the average cost.
  - The most important factor in determining the long-run profit potential in monopolistic competition is the elasticity of the market demand curve.
- I and II are true.
  - I is true, and II is false.
  - I is false, and II is true.
  - I and II are false.
16. Two firms operating in the same market must choose between a collude price and a cheat price. In the matrix below, Firm A's profit is listed before the comma, while Firm's B profit is listed after the comma.

		<b>Firm B</b>	
<b>Firm A</b>		<b>Cheat Price</b>	<b>Collude Price</b>
	<b>Cheat Price</b>	\$18m,\$18m	\$30m,\$6m
	<b>Collude Price</b>	\$6m,\$30m	\$24m,\$24m

If each firm tries to choose a price that is best for it regardless of the other firm's price, which of these statements is correct?

- Firm A should charge the collude price, Firm B should charge the cheat price.
- Firm A should charge the cheat price, Firm B should charge the collude price
- Both firms should charge the collude price.
- Both firms should charge the cheat price.

17. The marginal product of labour of a firm in a competitive product market is:  $MP_L = 24L^{-1/2}$ . The price of the product is \$2 per unit. The wage rate is \$12.00. How much labour will be hired to maximize profit?
- a. 4
  - b. 8
  - c. 16
  - d. 24
18. Assume that as the wage rate rises a worker's substitution effect for leisure is larger than the income effect. We can conclude that in this region, the worker's
- a. labour supply curve will be backward bending.
  - b. labour supply curve will have the usual upward slope.
  - c. labour supply curve will be completely inelastic.
  - d. labour supply curve will be horizontal.
19. Suppose a firm is a competitor in the product market and a monopsonist in the labour market. The current market price of the product that the firm produces is \$2. The total product curve of labour and the supply curve for labour are given as:

$$TP = 50L - 0.5L^2$$

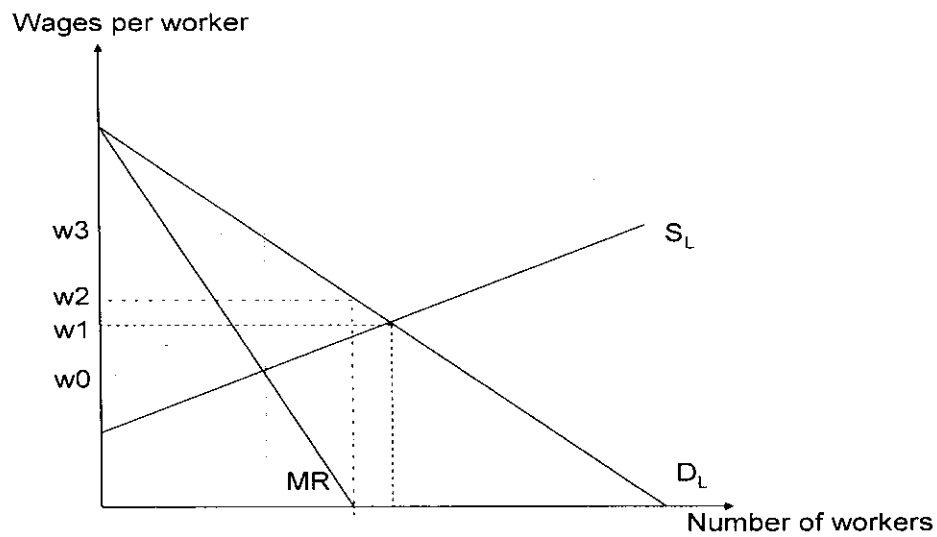
$$L = w - 10$$

where  $L$  is the amount of labour employed and  $w$  is the wage rate. How much will the monopsonist pay each worker?

- a. \$32.50
- b. \$55
- c. \$78
- d. \$83



20. The following question refers to the figure below.



To maximize total wages paid to workers, the labour union will agree to wage rate:

- a.  $w_0$
- b.  $w_1$
- c.  $w_2$
- d.  $w_3$

**Section B: Short-Answer Questions**

This section contains FOUR (4) short-answer questions. The total mark for each question is TEN (10). Write your answers in the space provided in this booklet.

**ATTEMPT ALL QUESTIONS**

1. Suppose Singapore's demand for and supply of local chicken is given by  $Q_d = 200 - 20P$  and  $Q_s = -10 + 50P$ , where  $Q$  is measured in millions of chickens per year, and  $P$  is measured in dollars per chicken. To answer this question, draw a diagram and indicate the changes for each and every part of the question on the same diagram. (2 marks)
  - a) Calculate the competitive market equilibrium price and quantity and the total surplus at that price. (2 marks)
  - b) Suppose, other things being equal, the government is concerned about the impact of the H5N1 bird flu outbreak on the incomes of our poultry farmers and decide on a price support scheme. Calculate the deadweight loss resulting from a price floor set at  $P = \$4.00$ . Show that the total surplus at a price of \$4.00 per chicken is less than the total surplus at the equilibrium price. (2 marks)
  - c) Which of the following two price support schemes will cost the government less? Demonstrate your answer numerically.
    - I. Buying the excess supply of chickens if a price support is set at  $P = \$4.00$ .
    - II. Paying the poultry farmers to entice them to restrict their supply to  $Q = 120$  million chickens? (4 marks)



2a) Suppose the production function of a factory is given as

$$Q = 12L^{1/2} + 8K^{1/2}.$$

- i. Does this production function exhibit diminishing returns to labour and capital? Demonstrate your answer numerically. (2 marks)
- ii. How much will output expand if the inputs are quadrupled? Are there economies or diseconomies of scale? (2 marks)

b) Suppose the long-run average cost for a firm is given by

$$LAC = 1000 + (1500 - q)^2.$$

At what output level does the firm reach a minimum of long-run average cost? Are there economies or diseconomies of scale? (2 marks)

c) Suppose a quadratic long-run average cost function was estimated for the insurance industry in Singapore as follows:

$$LAC = 2.38 - 0.6153q + 0.0536q^2$$

Output  $q$  is measured as the total assets of each insurance agency, and LAC is measured by average operating expense. Both  $q$  and LAC are measured in hundreds of millions of dollars.

- i. Demonstrate that at the minimum of long-run average cost, total assets of an agency is  $q = \$574$  million. (1 mark)
- ii. If two agencies merged, each with assets of \$287 million, would there be cost savings based on this LAC? Why or why not? Demonstrate your answer numerically. (2 marks)
- iii. Suppose you observed a particular agency operating at  $q = \$5.74$  (\$574 million) with  $LAC = 0.75$  (i.e., average operating expense of \$75 million). Is this agency operating efficiently? Why or why not? Demonstrate your answer numerically. (1 mark)



3a) Consider a monopolist facing the demand curve  $Q_D = 9,000 - 30P$ . The monopolist has two plants, one with  $MC_1 = 0.006Q_1$  and the other with  $MC_2 = 9$ . The fixed costs of operating each plant are zero.

i. What should be the output of this monopolist?

(2 marks)

ii. How should the output in part i) be divided between the two plants? Illustrate your answer.

(3 marks)

b) SilkAir flies between Singapore and Manado in North Sulawesi, Indonesia. Let's consider its pricing of first-class and economy-class tickets on this route which it has a monopoly. For simplicity, assume that the marginal cost of selling a seat in both the first class and the economy class is the same at \$200. Let the demand for first-class tickets be  $P = 1,000 - 5Q$ , while the demand for economy-class tickets is  $P = 500 - Q$ .

i. Find the monopoly price for first-class tickets and economy-class tickets.

(3 marks)

ii. What is the demand elasticity for each market segment at the profit-maximizing prices you found in part i)? Do these values make sense?

(2 marks)



- 4a. If  $C_1 = 20Q_1$  and  $C_2 = 10Q_2$ , find the differentiated-products Bertrand equilibrium, given the following demand curves:

$$\begin{aligned}Q_1 &= 2,000 - 40P_1 + 30P_2 \\Q_2 &= 1000 + 10P_1 - 30P_2\end{aligned}$$

(5 marks)

- b. Suppose Singapore Woodcraft is the dominant firm in the market producing rosewood drum stools. The market demand curve is  $P = 1,000 - 10Q$ , where  $P$  is the price in dollars and  $Q$  the number of drum stools produced annually. There are also other smaller rosewood stool manufacturers but because they do not have the long experience of Singapore Woodcraft, their production costs are higher. The competitive supply curve for the fringe manufacturers is  $Q_F = P/4$ . Assume that there are no fixed costs of production, and the marginal cost for Singapore Woodcraft is  $MC_{SW} = Q_{SW}$ .

What are the quantities produced by the dominant firm and the fringe?

(5 marks)





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