**NANYANG TECHNOLOGICAL UNIVERSITY**

**SEMESTER 1 EXAMINATION 2023-2024 (PRACTICE)**

**HE1001 MICROECONOMICS I**

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| **Seat Number :** |  |  |  |  |  |  |  |  |  |
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| **Matriculation Number :** |  |  |  |  |  |  |  |  |  |

**INSTRUCTIONS**

1. This paper contains **THREE (3)** questions and comprises **FIVE (5)** pages.
2. Answer all **THREE (3)** questions.
3. This is a **CLOSED-BOOK** examination.
4. There is **NO** answer book. Write down your answers in the space specified in this paper.
5. The number of marks allocated is shown at the end of each question.

**THIS PAPER MUST NOT BE REMOVED FROM THE EXAM HALL**

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**GRADES (FOR EXAMINER’S USE ONLY)**

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| --- | --- |
|  | **Marks** |
| Question 1 | /40 |
| Question 2 | /30 |
| Question 3 | /30 |
| **Total** |  |

**Question 1**

**Multiple-choice questions with justification. Please select the most appropriate answer and briefly explain why.**

1. Which of following is a key assumption of a perfectly competitive market?

(10 marks)

A) Firms are price-takers.

B) Commodities have many sellers.

C) It is difficult for new sellers to enter the market.

D) Each seller has a large share of the market.

E) Buyers have bargaining power.

F) Both A and B

G) Both A and C

H) Both B and D

I) A, B, and C

Answer: \_\_\_F\_\_\_\_

Justification:

1. Which of the following behaviours are inconsistent with standard economic models?

(10 marks)

1. John shops at Benjamin Barker. He chooses to purchase only 1 item when the promotion is "Buy 2 and get 25% off" but he switches to purchase 2 items when the promotion is revised to "Buy 1 and get 1 50% off."
2. In the recent popular Caifan song, Annette and Ben cannot decide what to order at a caifan stall. (Source: https://www.youtube.com/watch?v=kvtu8byJQhE)
3. When playing the ultimatum game, the proposer offers 10% of the endowment to the recipient. The recipient decides to reject the offer because he finds it unfair.
4. All of the behaviours described above are inconsistent with standard economic models.

Answer: \_\_\_D\_\_\_\_

Justification:

1. Consider the following game that represents the payoffs from different advertising campaigns (low, medium, and high spending) for two political candidates that are running for a particular office. The values in the payoff matrix represent the share of the popular vote earned by each candidate. These two candidates move simultaneously. Which of the following statements is correct?

(10 marks)

**Table

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1. Neither candidate has a dominant strategy, but the Nash equilibrium occurs where both candidates use medium advertising campaigns.
2. Candidate A's dominant strategy is high, Candidate B's dominant strategy is high, and this is the Nash equilibrium.
3. Neither candidate has a dominant strategy, but the Nash equilibrium occurs where both candidates use high advertising campaigns.

D) There is no Nash equilibrium for this game.

Answer: \_\_\_B\_\_\_\_

Justification:

1. Consider total cost and total revenue given in the following table. Please calculate profit for each quantity. How much should the firm produce to maximize profit?



(10 marks)

1. 2
2. 3
3. 4
4. 5
5. 6
6. 7
7. 3 or 4
8. 4 or 5
9. 5 or 6
10. 6 or 7

Answer: \_\_\_I\_\_\_\_

Justification:

**Question 2**

Consider two firms facing the demand curve P = 50 - 5Q, where Q = Q1 + Q2. The firms’ cost functions are C1(Q1) = 20 + 10 Q1 and C2(Q2) = 10 + 12 Q2.

1. Please solve for the Cournot equilibrium. (15 marks)

In the Cournot model, Firm 1 takes Firm 2’s output as given and maximizes profits. Firm 1’s profit function is

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Setting the derivative of the profit function with respect to *Q*1 to zero, we find Firm 1’s reaction function:



Similarly, Firm 2’s reaction function is .

To find the Cournot equilibrium, substitute Firm 2’s reaction function into Firm 1’s reaction function:



Substituting this value for *Q*1 into the reaction function for Firm 2, we find

*Q*2  2.4.

Substituting the values for *Q*1 and *Q*2 into the demand function to determine the equilibrium price:

*P*  50  5(2.8  2.4)  $24.

The profits for Firms 1 and 2 are equal to

**1  (24)(2.8)  (20  (10)(2.8))  $19.20, and

**2  (24)(2.4)  (10  (12)(2.4))  $18.80.

1. Please explain whether the Cournot equilibrium in part (a) is a Nash equilibrium. (15 marks)

The firms’ reaction curves and the Cournot equilibrium are shown below.

A picture containing text, antenna

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Yes, Cournot equilibrium is a Nash equilibrium. Given that Firm 1 chooses Q1=2.8, Q2=2.4 is Firm 2’s best action. Also, given that Firm 2 choose Q2=2.4, Q1=2.8 is Firm 1’s best action.

(TOTAL: 30 marks)

**Question 3**

Elizabeth Airlines (EA) flies only one route: Chicago-Honolulu. The demand for each flight is Q=500-P. EA's cost of running each flight is $30,000 plus $100 per passenger.

1. What is the profit-maximizing price that EA will charge? How many people will be on each flight? What is EA's profit for each flight? (15 marks)

First, find the demand curve in inverse form: *P*  500  *Q*.

Marginal revenue for a linear demand curve has twice the slope, so *MR*  500  2*Q*.

Setting marginal revenue equal to marginal cost (where *MC*  $100) yields

500  2*Q*  100, or *Q*  200 people per flight.

Substitute *Q*  200 into the demand equation to find the profit-maximizing price:

*P*  500  200, or *P*  $300 per ticket.

Profit equals total revenue minus total costs:

*π*  (300)(200)  [30,000  (100)(200)]  $10,000 per flight.

1. EA finds out that two different types of people fly to Honolulu. Type A consists of business people with a demand of QA = 260 - 0.4P. Type B consists of students whose total demand is QB = 240 - 0.6P. Because the students are easy to spot, EA decides to charge them different prices. What price does EA charge the students? What price does it charge other customers? How many of each type are on each flight? (15 marks)

Writing the demand curves in inverse form for the two markets:

*PA*  650  2.5*QA* and

*PB*  400  1.667*QB*.

Marginal revenue curves have twice the slope of linear demand curves, so we have:

*MRA*  650  5*QA*, and

*MRB*  400  3.33*QB*.

To determine the profit-maximizing quantities, set marginal revenue equal to marginal cost in each market:

650  5*QA*  100, or *QA*  110, and

400  3.33*QB*  100, or *QB*  90.

Substitute the profit-maximizing quantities into the respective demand curves:

*PA*  650  2.5(110)  $375, and

*PB*  400  1.667(90)  $250.

When EA is able to distinguish the two groups, the airline finds it profit-maximizing to charge a higher price to the Type *A* travelers, that is, those who have a less elastic demand at any price.

(TOTAL: 30 marks)