HE1001 Microeconomics

Final Practice 4 – Problems

Academic Year 2025/2026, Semester 1

Quantitative Research Society @NTU

November 17, 2025

Instructions:

- This practice examination contains **3 questions** worth a total of **100 marks**.

- Answer **all questions**.

- Show all working clearly. Partial credit may be awarded for correct methods.

- Write your answers in the spaces provided or on additional paper as needed.

- Calculators are permitted.

- Time allocation: approximately 2 hours.

Question 1: Multiple Choice Questions [30 marks]

Select the correct option for each of the following questions. Each question is worth 5 marks.

1.1 [Adapted from Tutorial 1, Question 4] **[5 marks]**

Suppose the demand curve for a product is $Q_D = 300 - 2P + 4I$, where P is price and I is consumer income. The supply curve is $Q_S = -100 + P$.

If consumer income $I = 50$, what is the equilibrium price?

(A) $P = 100$

(B) $P = 150$

(C) $P = 166.67$

(D) $P = 200$

1.2 [Adapted from Tutorial 2, Question 3] **[5 marks]**

Midcontinent Plastics makes 80 fiberglass truck hoods per day for large truck manufacturers. Each hood sells for $500. Midcontinent's total cost of producing 80 hoods is $20,000, and its marginal cost is $200.

What is Midcontinent's average cost per hood?

(A) $200

(B) $250

(C) $300

(D) $350

1.3 [Adapted from Tutorial 3, Question 2] **[5 marks]**

Janice has utility function $U(X, Y) = 4X^{0.5}Y^{0.5}$. Prices are $P_X = 10$ and $P_Y = 20$, and her income is $I = 600$.

If the price of good X decreases to $P_X = 5$, what happens to Janice's budget constraint?

(A) The budget line shifts outward parallel to the original line.

(B) The budget line rotates outward, pivoting at the Y-intercept.

(C) The budget line rotates inward, pivoting at the X-intercept.

(D) The budget line shifts inward parallel to the original line.

1.4   [Adapted from Tutorial 5, Question 3] **[5 marks]**

A chair manufacturer has the following short-run production function (labour is the only variable input):

$$q = 20L^2 - L^3,$$

where q is output (chairs) and L is labour input (workers).
    At what level of labour input does the average product of labour reach its maximum?

(A) $L = 5$

(B) $L = 10$

(C) $L = 15$

(D) $L = 20$

1.5   [Adapted from Tutorial 7, Question 3] **[5 marks]**

In a local market, there are 1,000 identical producers, each with short-run total cost $TC = 100 + q^2$, where q is individual firm output. Market demand is $Q = 50{,}000 - 500P$.
    In the short run, if market price is $P = \$50$, what is each firm's profit?

(A) $525

(B) $600

(C) $675

(D) $750

(E) $825

(F) $900

(G) $975

1.6   [Adapted from Tutorial 8, Question 1] **[5 marks]**

A perfectly competitive firm has long-run total cost $TC = q^3 - 12q^2 + 60q$, where q is output.
    At what output level does the firm's long-run average cost reach its minimum?

(A) $q = 4$

(B) $q = 6$

(C) $q = 8$

(D) $q = 10$

Question 2: Multiple Choice Questions with Justification   [30 marks]

Select the correct option and provide a brief justification for your answer. Each question is worth 10 marks (5 marks for correct answer, 5 marks for justification).

2.1   [Adapted from Tutorial 3, Question 8]   [**10 marks**]

Marginal utility measures:

 (A) The slope of the indifference curve.

 (B) The additional satisfaction from consuming one more unit of a good.

 (C) The slope of the budget constraint.

 (D) The ratio of prices.

   Explain how marginal utility relates to consumer choice at the optimal bundle.

Justification:

2.2   [Adapted from Tutorial 6, Question 5]   [**10 marks**]

A firm has short-run total cost function $TC = 200 + 55q$, where TC is total cost and q is output.
   Which of the following statements is true?

 (A) Average fixed cost is constant at all output levels.

 (B) Marginal cost is constant at $55 per unit.

 (C) Average total cost increases continuously as output increases.

 (D) Average variable cost is increasing.

Justification:

2.3 [Adapted from Tutorial 9, Question 4] [**10 marks**]

A monopolist sells in two markets: East Coast (EC) with demand $P_1 = 15 - Q_1$ and West Coast (WC) with demand $P_2 = 25 - 2Q_2$. Total cost is $C = 5 + 3(Q_1 + Q_2)$.

   Assuming the monopolist can price discriminate between the two markets, which market will have the higher price?

 (A) East Coast

 (B) West Coast

 (C) Both markets will have the same price

 (D) Cannot determine without solving

   Explain your reasoning based on demand elasticities.

Justification:

Question 3: Structured Problems [40 marks]

Answer all parts of each question. Show all working clearly.

3.1 [Adapted from Tutorial 3, Question 3] **[13 marks]**

Consider consumer preferences for hamburgers (H) and soft drinks (S):

Molly's preferences: Molly loves hamburgers but dislikes soft drinks. She gets positive utility from hamburgers but negative utility from soft drinks.

Mary's preferences: Mary views hamburgers and soft drinks as perfect complements— she always consumes them in a 1:1 ratio (one hamburger with one soft drink).

(a) Sketch Molly's indifference curves with hamburgers on the horizontal axis and soft drinks on the vertical axis. Explain the shape. [4 marks]

(b) Sketch Mary's indifference curves with the same axes. Explain the shape. [4 marks]

(c) If both Molly and Mary have income $I = \$20$, $P_H = \$2$ per hamburger, and $P_S = \$1$ per soft drink, find each person's optimal consumption bundle. [5 marks]

3.2 [Adapted from Tutorial 7, Question 9] **[14 marks]**

Bette's Breakfast, a perfectly competitive eatery, sells its "Breakfast Special" for $P = \$5.00$ per meal. The firm's cost structure is:

- Total Fixed Cost: $TFC = \$100$

- Total Variable Cost: $TVC = 0.5q^2$, where q is the number of meals

(a) Find the firm's marginal cost (MC) function. [2 marks]

(b) Find the profit-maximizing output level q^*. [3 marks]

(c) Calculate total revenue, total cost, and profit at q^*. [4 marks]

(d) Find the firm's shutdown price (the minimum of average variable cost). Should the firm continue operating in the short run at $P = \$5$? [5 marks]

3.3 [Adapted from Tutorial 10, Question 1] **[13 marks]**

Two firms, Firm A and Firm B, simultaneously choose between producing High quality (H) or Low quality (L) products. The payoff matrix (Firm A's payoff, Firm B's payoff) is:

	Firm B: High	**Firm B: Low**
Firm A: High	(50, 50)	(20, 60)
Firm A: Low	(60, 20)	(30, 30)

(a) Does either firm have a dominant strategy? Explain. [4 marks]

(b) Find all Nash equilibria (if any) in pure strategies. Show your working. [5 marks]

(c) Is this game an example of a Prisoner's Dilemma? Explain why or why not. [4 marks]

END OF EXAMINATION