HE1001 Microeconomics

Final Practice 1 – Problems

Academic Year 2025/2026, Semester 1

Quantitative Research Society @NTU

November 12, 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 2] **[5 marks]**

The inverse demand curve for product X is given by $P = 25 - 0.005Q + 0.15I$, where P is the price of X, Q is the quantity demanded of X, and I is consumer income. The inverse supply curve for product X is given by $P = 5 + 0.004Q$.

If consumer income is \$50, the equilibrium price and quantity are:

(A) $P^* = 10$, $Q^* = 2{,}000$

(B) $P^* = 15$, $Q^* = 2{,}500$

(C) $P^* = 20$, $Q^* = 3{,}000$

(D) $P^* = 25$, $Q^* = 3{,}500$

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

Suppose a demand curve passes through two points: Point B at (Q_1, P_1) and Point C at (Q_2, P_2), where $Q_2 > Q_1$ and $P_2 < P_1$. Between points B and C, demand is:

(A) perfectly elastic.

(B) perfectly inelastic.

(C) upward sloping.

(D) downward sloping.

1.3 [Adapted from Tutorial 3, Question 6] **[5 marks]**

Which of the following is correct about moving along an indifference curve?

(A) Utility increases.

(B) Marginal utility remains constant.

(C) Total utility remains constant.

(D) Marginal rate of substitution increases.

1.4 [Adapted from Tutorial 5, Question 1] **[5 marks]**

Which of the following best describes behavioural economics?

(A) Consumers always maximize utility subject to budget constraints.

(B) Firms always maximize profits.

(C) People make systematic errors in decision-making.

(D) Markets always reach equilibrium efficiently.

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

A firm maximizes profit by operating at the level of output where:

(A) Total revenue is maximized.

(B) Marginal revenue equals marginal cost.

(C) Marginal revenue exceeds marginal cost by the greatest amount.

(D) Total cost is minimized.

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

Ronny's Pizzeria is a perfectly competitive firm producing gourmet cheese pizzas. Current market conditions: equilibrium price $P = \$10$ per pizza. Ronny's cost structure: $TC = 20 + 2Q + 0.5Q^2$. If the price of gourmet cheese (a key input) rises, causing Ronny's marginal cost curve to shift upward, what happens to Ronny's optimal output?

(A) Output increases.

(B) Output decreases.

(C) Output remains unchanged.

(D) Cannot be determined without knowing the demand elasticity.

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 7] **[10 marks]**

A curve that represents all combinations of market baskets providing the same level of utility to a consumer is called:

(A) A budget line.

(B) An isoquant.

(C) An indifference curve.

(D) A demand curve.

At a consumer's optimal consumption bundle, the indifference curve is tangent to the budget line. What condition must hold at this tangency point?

Justification:

2.2 [Adapted from Tutorial 6, Question 4] **[10 marks]**

Consider a production function with two inputs, capital (K) and labour (L). Isoquants for this production function are plotted with K on the vertical axis and L on the horizontal axis. The isoquants are straight lines with a constant slope of -2.

This production function exhibits:

(A) Constant returns to scale.

(B) Increasing returns to scale.

(C) Decreasing returns to scale.

(D) Cannot determine returns to scale from isoquant shape alone.

Justification:

2.3 [Adapted from Tutorial 8, Question 8] **[10 marks]**

In an increasing-cost industry, expansion of output:

(A) causes input prices to rise as demand for them grows.

(B) leaves input prices constant as input demand grows.

(C) causes economies of scale to occur.

(D) occurs under conditions of increasing returns to scale.

How does this affect the long-run industry supply curve?

Justification:

Question 3: Structured Problems [40 marks]

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

3.1 [Adapted from Tutorial 2, Question 2] **[14 marks]**

Consider a corn market with demand $Q_d = 3{,}200 - 800P$ and supply $Q_s = -400 + 1{,}200P$, where Q is in millions of bushels per year and P is in dollars per bushel.

(a) Find the equilibrium price and quantity. [3 marks]

(b) Calculate the price elasticities of demand and supply at equilibrium. [4 marks]

(c) Suppose the government imposes a subsidy of \$0.30 per bushel to producers. Find the new equilibrium quantity, the price paid by consumers, and the price received by producers. [7 marks]

3.2 [Adapted from Tutorial 8, Question 2] **[13 marks]**

Consider a perfectly competitive industry initially in long-run equilibrium. Each firm has the same cost structure: $TC = 50 + 2q + 0.5q^2$, where q is the firm's output.

Market demand is $Q_d = 1{,}000 - 50P$.

(a) Find each firm's minimum average total cost and the corresponding output level. [4 marks]

(b) At long-run equilibrium, what is the market price? How many units does each firm produce? [3 marks]

(c) Find the total number of firms in the industry in long-run equilibrium. [3 marks]

(d) Suppose demand increases to $Q_d = 1{,}200 - 50P$. In the short run (with the number of firms fixed), what happens to price and industry output? In the long run, what happens to the number of firms? [3 marks]

3.3 [Adapted from Tutorial 9, Question 3] **[13 marks]**

Airlines often engage in third-degree price discrimination by offering different fares to business and leisure travelers.

Consider an airline with two passenger segments:

- Business travelers: Demand $Q_B = 400 - 2P_B$
- Leisure travelers: Demand $Q_L = 600 - 4P_L$

The airline's total cost is $TC = 10{,}000 + 50Q$, where $Q = Q_B + Q_L$.

(a) Derive the marginal revenue functions for each market segment. [3 marks]

(b) Find the profit-maximizing prices and quantities for each segment. [5 marks]

(c) Calculate total profit under price discrimination. [2 marks]

(d) Explain how requiring a Saturday-night stay allows airlines to separate business and leisure travelers, enabling this pricing strategy. [3 marks]

END OF EXAMINATION