

[illegible]

1. The demand curve is $D(p) = 50 - p$. When $p = 25$ consumers' expenditure (E) and (net) consumers' surplus (CS) are:
 - a) $E = 625$, $CS = 312.5$.
 - b) $E = 312.5$, $CS = 325$.
 - c) $E = 625$, $CS = 937.5$.
 - d) $E = 937.5$, $CS = 312.5$.
2. When a price rises, the compensating variation is:
 - a) The extra income the consumer would need to keep buying the original bundle.
 - b) The minimum extra income the consumer would need to buy a bundle on the original indifference curve.
 - c) The money the consumer would be willing to pay to be able to keep buying the good at the old price.
 - d) None of the other alternatives is correct.
3. The change in consumer surplus equals the compensating variation if preferences are:
 - a) Convex.
 - b) Monotonic.
 - c) Cobb-Douglas.
 - d) Quasi-linear.
4. The demand curve is $Q^D(p) = 10 - 2p$. When $p = 4$, price-elasticity of demand is:
 - a) -0.5.
 - b) -1.
 - c) -2.
 - d) -4.
5. In the short run, as more firms enter a perfectly competitive market:
 - a) Price falls, and firms' profits remains unchanged.
 - b) Price and firms' profits fall.
 - c) Price and firms' profits increase.
 - d) Price increases and firms' profits fall.
6. Which of the following is **NOT** a feature of the long-run perfectly competitive equilibrium?
 - a) Each firm has a decreasing marginal revenue.
 - b) Quantity demanded equals quantity supplied.
 - c) Each firm maximises profit given the market price.
 - d) Each firm makes approximately zero profit.
7. According to the Walras law, in a two-good economy:
 - a) There can be excess demand in one market and equilibrium in the other.
 - b) If there is excess demand in one market, there must be excess supply in the other.
 - c) The value of excess demand is positive if market are not in equilibrium.
 - d) There can be excess supply in one market and equilibrium in the other.
8. In the Edgeworth box, if an allocation is Pareto efficient:
 - a) It belongs to the contract curve.
 - b) There are no possible gains from additional exchanges.
 - c) It is not possible to make an agent better off without making the other worse off.
 - d) All other alternatives are correct.
9. The production function $f(L, K) = 0.2L^{0.6}K^{0.7}$ exhibits:
 - a) Decreasing returns to scale.
 - b) Constant returns to scale.
 - c) Increasing returns to scale.
 - d) The information is insufficient to answer.
10. A firm reduces all inputs by 30%, and its output falls by 40%. This means that the firm's technology exhibits:
 - a) Increasing returns to scale.
 - b) Decreasing returns to scale.
 - c) Decreasing marginal product.
 - d) Increasing marginal product.
11. A firm currently makes zero profit and has $\partial\pi/\partial x_i = 0$ for all inputs x_i . The firm enjoys increasing returns to scale for all output levels. Then the firm:
 - a) Can increase profit by producing more.
 - b) Can increase profit by producing less.
 - c) Is minimising profit.
 - d) Is maximising profit.
12. In the cost function $c(y) = \begin{cases} 4y + K + T & \text{if } y > 0 \\ 4y + K & \text{if } y = 0 \end{cases}$ with K and T constant, T is:
 - a) A fixed cost.
 - b) A quasi-fixed cost.
 - c) A variable cost.
 - d) Fixed in the short run and variable in the long run.
13. A firm currently has average cost 9 and marginal cost 5. Then at the current output level the average cost curve is:
 - a) Upward sloping.
 - b) Downward sloping.
 - c) Horizontal.
 - d) The information is not enough to answer.
14. A firm producing a quantity such that marginal cost equals the price maximises profit if and only if at that quantity:
 - a) It has constant marginal costs.
 - b) It has increasing marginal costs.
 - c) It has decreasing marginal costs.
 - d) It maximises profit regardless of whether marginal costs are constant, increasing or decreasing.
15. A firm uses input X to produce Y . The price of X is €9, and that of Y is €2. Presently, marginal product of X is 5. Can the firm increase profit?
 - a) Yes, using more X .
 - b) Yes, using less X .
 - c) No.
 - d) The information is insufficient to answer.
16. The variable cost equals the area:
 - a) Underneath the marginal cost curve.
 - b) Underneath the average variable cost curve.
 - c) Underneath the average cost curve.
 - d) Between the marginal and average cost curves.

Regular-Period Exam — Part B

Maximum duration of the exam: 90 minutes

5. You cannot look up books or notes of any kind. Invigilators will not help you with the test.
6. Switch off and put away any graphical calculators, computers, mobile phones, or any other data storage device.

QUESTION 1 (5 marks)

A firm operate with the production function $y = f(L, K) = L^{1/5}K^{1/3}$. Input prices are $w_L = 10$ and $w_K = 5$.

- a) [1.5 mark] Find the technical rate of substitution.
- b) [2.5 marks] Suppose the firm is using $L = 100$ and $K = 500$. Show that the firm is not operating efficiently.
- c) [1 mark] What is the maximum the firm could produce while not spending more on inputs than in part b)?

QUESTION 2 (5 marks)

The following parts are independent of each other.

- a) [2.5 marks] A firm operate with the short-run cost function $c(y) = y^2 + 8$. Find the firm's short-run supply curve, and show it in a graph. Explain and show all relevant calculation.
- b) [2.5 marks] In a perfectly competitive market, each firm operates with the cost curve

$$c(y) = \begin{cases} y^2 + 25 & \text{if } y > 0 \\ 0 & \text{if } y = 0 \end{cases}$$

Demand is $Y^D(p) = 100 - p$. Find the long-run equilibrium number of firms. Explain and show all relevant calculations.

Answers to Part A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
a	b	d	d	b	a	b	d	c	a	a	b	b	b	a	a

Answers to Part B

Question 1

a) $TRS = -MP_L/MP_K = -(1/5)L^{-4/5}K^{1/3}/[(1/3)L^{1/5}K^{-2/3}] = -0.6K/L$.

b) Efficiency requires $TRS = -w_L/w_K$. $TRS(100, 500) = -0.6 \times 500/100 = -3$; $-w_L/w_K = -10/5 = -2$, so the firm is not operating efficiently.

c) This problem is formally identical to utility maximisation subject to the budget constrain. The firm is constrained by:

$$w_L L + w_K K = 10 \times 100 + 5 \times 500 \Leftrightarrow 10L + 5K = 3,500 \quad (1)$$

And to produce efficiently:

$$TRS = -w_L/w_K \Leftrightarrow -0.6K/L = -2 \Leftrightarrow L = 0.3K \quad (2)$$

Substitute (2) into (1)

$$10 \times 0.3K + 5K = 3,500 \Leftrightarrow 8K = 3,500 \Leftrightarrow K = 437.5.$$

$$\text{From (2), } L = 0.3 \times 437.5 = 131.25.$$

Question 2

a) The firm's short-run function coincides with the marginal cost curve above the minimum variable average cost (and the vertical axis below it). $AVC = VC/y = y^2/y = y$, so its minimum is zero: the firm will sell at any price above zero. So $MC = p \Leftrightarrow 2y = p \Leftrightarrow y = 0.5p$.

b) In the long-run equilibrium profits are zero, so the price equals the minimum average cost; it also equals marginal cost as firms maximise profit. So:

$$MC = AC \Leftrightarrow 2y = y + 25/y \Leftrightarrow y^2 = 25 \Leftrightarrow y = 5.$$

So the price is $AC(5) = 10 = MC(y)$. Quantity demanded is $Y^D(10) = 100 - 10 = 90$. As each firm produces 5, it takes $90/5 = 18$ firms to supply the whole market.