S4 Economics Practice Paper: Scarcity and Opportunity Cost, Demand, Supply and Equilibrium Price, Rent Ceiling and Non-price Rationing, Production Cost and Shutdown, Perfect Competition and Monopoly, Comparative Advantage and Trade

S4 Economics | 100 marks | 75 minutes

Question 1: Scarcity, Opportunity Cost and the Production Possibility Curve

A country with fixed resources produces only rice and cloth. If all resources grow rice, output is 800 tonnes; if all resources make cloth, output is 4 million metres. Its production possibility curve is a straight line.

Calculate the opportunity cost of producing one more tonne of rice. *(4 marks)*

Answer: Opportunity cost = 4,000,000 m / 800 t = 5,000 m of cloth. Each extra tonne of rice costs 5,000 m of cloth.

If the country produces 200 tonnes of rice, what is the maximum output of cloth? *(4 marks)*

Answer: Rice uses 200 / 800 = 25 per cent of resources, leaving 75 per cent for cloth: 4,000,000 m x 0.75 = 3,000,000 m.

If one tonne of rice trades for 6,000 m of cloth on the world market, in which good should the country specialise? Explain. *(4 marks)*

Answer: It should specialise in rice. Growing a tonne of rice costs only 5,000 m of cloth at home but earns 6,000 m through trade, a net gain of 1,000 m, so specialising in rice and importing cloth is better.

Does a straight-line production possibility curve show increasing, decreasing or constant opportunity cost? Give one reason why a production possibility curve may bow outwards (increasing opportunity cost). *(4 marks)*

Answer: A straight line means constant opportunity cost. If resources are not perfectly transferable (for example some land suits rice and some suits cotton), shifting resources progressively towards one good raises the amount of the other good given up, so the curve bows outwards and opportunity cost increases.

Question 2: Demand, Supply and Equilibrium Price

The market demand for a good is Qd = 1,200 - 40P and supply is Qs = 200 + 60P, where P is the price in dollars and Q is the quantity in units.

Find the equilibrium price and quantity. *(4 marks)*

Answer: Set Qd = Qs: 1,200 - 40P = 200 + 60P, so 1,000 = 100P and P = $10; then Q = 1,200 - 40 x 10 = 800 units.

Calculate the producers total revenue at equilibrium. *(4 marks)*

Answer: Total revenue = price x quantity = $10 x 800 = $8,000.

If the government sets a minimum price (price floor) of $12, what happens in the market and by how much do the two quantities differ? *(4 marks)*

Answer: The floor is above equilibrium, so there is excess supply. Qd = 1,200 - 480 = 720 and Qs = 200 + 720 = 920, giving a surplus of 200 units.

Calculate the price elasticity of demand at equilibrium (point elasticity) and state whether demand is elastic or inelastic. *(4 marks)*

Answer: Point elasticity = (dQ/dP) x (P/Q) = -40 x (10 / 800) = -0.5. The absolute value 0.5 is below 1, so demand is inelastic.

Question 3: Rent Ceiling, Shortage and Non-price Rationing

Demand for small flats in a city is Qd = 5,000 - 20R and supply is Qs = 1,000 + 20R, where R is the monthly rent in dollars and Q is the number of units. The government then imposes a rent ceiling of $80 per month.

Find the equilibrium rent and quantity traded before rent control. *(4 marks)*

Answer: Setting 5,000 - 20R = 1,000 + 20R gives 4,000 = 40R, so R = $100 and Q = 5,000 - 2,000 = 3,000 units.

Under the $80 rent ceiling, find quantity demanded, quantity supplied and the shortage. *(4 marks)*

Answer: Qd = 5,000 - 1,600 = 3,400 and Qs = 1,000 + 1,600 = 2,600, so the shortage is 800 units.

Why is the shortage caused by a rent ceiling usually smaller in the short run than in the long run? *(4 marks)*

Answer: In the short run the housing stock and tenancy agreements are fixed, so supply is inelastic and few units can be withdrawn. In the long run landlords may convert units to other uses, stop maintaining them or redevelop, so supply is more elastic and shrinks further, making the shortage larger.

State two forms of non-price rationing that appear under a rent ceiling. *(4 marks)*

Answer: First, queuing or balloting to allocate flats; second, landlords charging key money, furniture fees or rent under the table, creating a black market. Landlords may also screen tenants or demand longer leases.

Question 4: Short-run Production Cost and the Shutdown Decision

A firm has total cost TC = 5,000 + 40Q + 0.5Q^2 in dollars, where Q is output in units. Total fixed cost is constant in the short run.

Find total cost and average cost when Q = 100. *(4 marks)*

Answer: TC = 5,000 + 4,000 + 5,000 = $14,000 and AC = 14,000 / 100 = $140.

Find marginal cost when Q = 100. *(4 marks)*

Answer: MC = dTC/dQ = 40 + Q, so at Q = 100, MC = $140, equal to AC at that point.

If output rises from 100 to 120 units, find the average incremental cost per unit. *(4 marks)*

Answer: TC(120) = 5,000 + 4,800 + 7,200 = $17,000, so the incremental cost is (17,000 - 14,000) / 20 = $150 per unit.

If the market price is $80, should the firm shut down? Explain by comparing its loss with total fixed cost. *(4 marks)*

Answer: Producing where P = MC gives 80 = 40 + Q, so Q = 40. TR = 80 x 40 = $3,200 and TC = 5,000 + 1,600 + 800 = $7,400, a loss of $4,200. As the loss is smaller than the $5,000 fixed cost of shutting down, the firm should keep producing in the short run.

Question 5: Perfect Competition and Monopoly

Market demand is P = 100 - 2Q and marginal cost is constant at $20 with no fixed cost. The market is first a monopoly and later becomes perfectly competitive.

State two features of a perfectly competitive market. *(4 marks)*

Answer: First, there are many buyers and sellers, each firm is tiny and is a price taker. Second, the product is homogeneous, information is perfect and firms can enter or exit freely, so only normal profit is earned in the long run.

Find the monopoly profit-maximising quantity and price. *(5 marks)*

Answer: TR = 100Q - 2Q^2, so MR = 100 - 4Q. Setting MR = MC gives 100 - 4Q = 20, hence Q = 20 and P = 100 - 40 = $60.

Calculate the monopoly profit at that output. *(5 marks)*

Answer: Profit = (P - MC) x Q = (60 - 20) x 20 = $800, since with no fixed cost profit equals TR - TC.

If the market becomes perfectly competitive, find output and the deadweight loss relative to monopoly. *(4 marks)*

Answer: Under perfect competition P = MC gives 100 - 2Q = 20, so Q = 40. The deadweight loss is the triangle between them: 0.5 x (60 - 20) x (40 - 20) = $400.

Question 6: Comparative Advantage and International Trade

Each of countries A and B has one hour of labour that can grow rice or make cloth. In one hour A can produce 4 tonnes of rice or 80,000 m of cloth; B can produce 1 tonne of rice or 30,000 m of cloth. Both produce only these two goods and may specialise and trade.

Calculate the opportunity cost of one tonne of rice in each country. *(4 marks)*

Answer: Country A: 80,000 / 4 = 20,000 m of cloth. Country B: 30,000 / 1 = 30,000 m of cloth.

In which good does each country have a comparative advantage? *(4 marks)*

Answer: A gives up only 20,000 m of cloth per tonne of rice against Bs 30,000 m, so A has a comparative advantage in rice. B gives up about 0.333 tonnes of rice per 30,000 m of cloth against As 0.5 tonnes, so B has the comparative advantage in cloth.

If both countries specialise according to comparative advantage, between which two values should the trading rate for one tonne of rice lie? *(5 marks)*

Answer: The rate must lie between the two domestic opportunity costs, that is above 20,000 m but below 30,000 m of cloth, so that both countries gain.

If they agree to trade one tonne of rice for 25,000 m of cloth, calculate each countrys gain per tonne of rice. *(5 marks)*

Answer: A gives up only 20,000 m to grow a tonne of rice but receives 25,000 m, gaining 5,000 m. B would give up 30,000 m to grow it but pays only 25,000 m, saving 5,000 m of cloth.