S5 Economics Practice Paper: Demand and Supply, Market Equilibrium, Consumer and Producer Surplus, Price Elasticity, Price Ceiling and Floor, Unit Tax and Subsidy, Costs of Production, Market Structure and HHI, National Income and the Multiplier (100 marks)

Level: S5 | Subject: Economics | 60 minutes | 100 marks | 24 questions | answer key

Section A: Demand, Supply and Market Equilibrium (17 marks)

Each question is worth 4-5 marks; show the equations and working.

#	Question	Answer	Marks
1	In a market, demand is Qd = 120 - 2P and supply is Qs = 3P - 30 (P in dollars, Q in units). Find the equilibrium price and quantity, and calculate the consumer surplus and producer surplus at equilibrium.	At equilibrium 120 - 2P = 3P - 30, so 5P = 150 and P = 30, Q = 60. The demand curve meets the price axis at 60 and the supply curve at 10. Consumer surplus = (60 - 30) x 60 / 2 = 900; producer surplus = (30 - 10) x 60 / 2 = 600; total surplus = 1500.	5
2	If the government sets the price at 20, find the quantity demanded, the quantity supplied and the size of the shortage or surplus.	At P = 20: Qd = 80 and Qs = 30. Since Qd exceeds Qs there is a shortage of 50 units, and only 30 units are actually traded.	4
3	If demand rises by 20 units at every price (new Qd = 140 - 2P) and supply is unchanged, find the new equilibrium price and quantity.	New equilibrium: 140 - 2P = 3P - 30, so 5P = 170, P = 34 and Q = 72. Demand rises, so price rises from 30 to 34 and quantity from 60 to 72.	4
4	Technical progress raises supply by 10 units at every price (new Qs = 3P - 20) with demand unchanged. Find the new equilibrium price and quantity and state the direction of the price change.	New equilibrium: 120 - 2P = 3P - 20, so 5P = 140, P = 28 and Q = 64. Higher supply pushes price down from 30 to 28 (a fall of 2) while quantity rises to 64.	4

Section B: Elasticity of Demand (17 marks)

Each question is worth 4-5 marks; state the sign of each elasticity and interpret it.

#	Question	Answer	Marks
5	Demand is Qd = 120 - 2P. When price rises from 30 to 36, quantity falls from 60 to 48 units. Use the arc elasticity formula to calculate the price elasticity of demand over this range and say whether demand is elastic, unit elastic or inelastic.	Arc PED = (-12 / 54) / (6 / 33) = -1.22. Since |PED| = 1.22 > 1, demand is elastic over this range.	5
6	Find the point elasticity at P = 30, then compare total revenue at P = 30 and P = 36 and explain the link between total revenue and elasticity.	Point elasticity = (dQ/dP)(P/Q) = (-2)(30 / 60) = -1.0, i.e. unit elastic. Total revenue is 30 x 60 = 1800 at P = 30 and 36 x 48 = 1728 at P = 36. Revenue is maximised at unit elasticity; in the elastic range a price rise at P = 36 cuts revenue by 72.	4

7	A consumer's income rises from 20,000 to 24,000 dollars and demand for a good rises from 500 to 560 units. Calculate the income elasticity of demand and classify the good.	Income rises by 4,000 / 20,000 = 20 per cent and demand by 60 / 500 = 12 per cent. YED = 12 / 20 = 0.6. With 0 < YED < 1 the good is a normal necessity.	4
8	A 10 per cent rise in the price of good A raises demand for good B by 4 per cent; another pair of goods C and D has a cross elasticity of -0.8. Find the cross elasticity of A and B and identify the relationship in both pairs.	XED(A,B) = 4 / 10 = +0.4. A positive value means demand for B rises when A becomes dearer, so A and B are substitutes. C and D have XED = -0.8 < 0, so they are complements.	4

Section C: Price Controls, Unit Tax and Subsidy (17 marks)

Each question is worth 4-5 marks; express tax incidence in dollars and per cent.

#	Question	Answer	Marks
9	In the same market (Qd = 120 - 2P, Qs = 3P - 30) the government imposes a price ceiling of 24. Find the quantity demanded, the quantity supplied, the shortage and the quantity actually traded.	At P = 24: Qd = 72 and Qs = 42. The shortage is 30 units and only 42 units change hands because supply is the binding side. A ceiling only bites if it is set below the equilibrium price of 30.	5
10	If instead a price floor of 40 is imposed, find the quantity demanded, the quantity supplied, the surplus and the quantity traded.	At P = 40: Qd = 40 and Qs = 90, so there is a surplus of 50 units. Only 40 units are traded and 50 go unsold.	4
11	The government levies a unit tax of 5 on sellers (new supply Qs = 3P - 45). Find the new equilibrium price and quantity, the tax borne by consumers and producers (in dollars and per cent), tax revenue and the deadweight loss.	New equilibrium: 120 - 2P = 3P - 45, so 5P = 165, P = 33 and Q = 54. Consumers pay 3 more per unit (60 per cent of the tax); sellers keep 33 - 5 = 28, i.e. 2 less (40 per cent). Tax revenue = 5 x 54 = 270; deadweight loss = 5 x (60 - 54) / 2 = 15.	4
12	The government instead pays sellers a subsidy of 5 per unit (new supply Qs = 3P - 15). Find the new equilibrium price and quantity and the total subsidy paid.	New equilibrium: 120 - 2P = 3P - 15, so 5P = 135, P = 27 and Q = 66. Consumers pay 3 less per unit and sellers receive 27 + 5 = 32, i.e. 2 more. Total subsidy = 5 x 66 = 330.	4

Section D: Costs of Production and the Firm (17 marks)

Each question is worth 4-5 marks; show the cost formulas used.

#	Question	Answer	Marks
13	A firm has total cost TC = 400 + 20Q + 2Q^2 in dollars. At Q = 10, find total cost, average cost, marginal cost, average fixed cost and average variable cost.	TC = 400 + 20(10) + 2(10^2) = 800; AC = 800 / 10 = 80; MC = 20 + 4Q = 60; AFC = 400 / 10 = 40; AVC = 400 / 10 = 40. Check: AFC + AVC = 40 + 40 = 80 = AC.	5
14	Find total cost, average cost and marginal cost at Q = 15, and explain why average cost has fallen.	TC = 1150, AC = 1150 / 15 = 76.67 and MC = 20 + 4(15) = 80. AC falls from 80 at Q = 10 because the fixed cost of 400 is spread over more units; MC (80) is now above AC (76.67), so further expansion would push AC back up.	4
15	Find the output that minimises average cost and the minimum average cost (give both to two decimal places).	AC = 400/Q + 20 + 2Q, and AC is minimised where AC = MC: 400/Q = 2Q, so Q^2 = 200 and	4

		Q = 14.14. AC_min = 400 / 14.1421 + 20 + 2(14.1421) = 76.57, where MC also equals 76.57.	
16	In a perfectly competitive market the price is 60. Find the profit-maximising output, total revenue and profit or loss, and decide whether the firm should keep producing in the short run.	Set P = MC: 20 + 4Q = 60, so Q = 10. TR = 600, TC = 800 and the loss is 200. Since AVC = 40 is below the price of 60, the firm covers its variable cost and should keep producing in the short run.	4

Section E: Market Structure and Competition (16 marks)

Each question is worth 4 marks; compute HHI as the sum of squared percentage market shares.

#	Question	Answer	Marks
17	A monopolist faces demand P = 100 - 2Q and has total cost TC = 200 + 20Q. Find the profit-maximising output, price and profit.	TR = 100Q - 2Q^2 so MR = 100 - 4Q, and MC = 20. Setting MR = MC gives Q = 20 and P = 60. TR = 1200, TC = 600 and profit = 600.	4
18	Find the allocatively efficient output and price where P = MC, and calculate the deadweight loss relative to the monopoly output.	Efficiency requires P = MC: 100 - 2Q = 20, so Q = 40 and P = 20. Deadweight loss = (60 - 20) x (40 - 20) / 2 = 400. The monopolist produces 20 units less and charges 40 more.	4
19	Four firms in an industry have market shares of 40, 30, 20 and 10 per cent. Calculate the Herfindahl-Hirschman Index (HHI); what is the HHI if the four firms each hold 25 per cent?	HHI = 40^2 + 30^2 + 20^2 + 10^2 = 1,600 + 900 + 400 + 100 = 3000. With four equal 25 per cent shares, HHI = 4 x 625 = 2500, a fall of 500 points and a more competitive structure.	4
20	Explain why an industry with an HHI of 3,000 is usually less competitive than one with an HHI of 2,500, and state one condition necessary for price discrimination.	An HHI of 3,000 means shares are concentrated in a few firms (the largest holding 40 per cent), giving them the market power to restrict output and charge near-monopoly prices; at 2,500 shares are more even, so rivalry pushes price closer to marginal cost. Conditions for price discrimination include: the market can be separated into groups with different demand elasticities, resale is impossible, and the firm has market power.	4

Section F: National Income, Multiplier and Macro Indicators (16 marks)

Each question is worth 4-5 marks; state formulas and units.

#	Question	Answer	Marks
21	An economy has C = 200 + 0.75Yd, T = 200, I = 300, G = 400, X = 250 and M = 150 (in billions). Find the multiplier and the equilibrium national income.	Multiplier = 1 / (1 - 0.75) = 4. AE = 200 + 0.75(Y - 200) + 300 + 400 + 250 - 150 = 850 + 0.75Y. Setting Y = AE gives 0.25Y = 850, so Y = 3400.	4
22	If government spending rises by 100 (G = 500), find the new equilibrium income and the change in income.	Autonomous spending rises from 850 to 950, so Y = 950 x 4 = 3800, an increase of 400, equal to 100 x the multiplier of 4.	4
23	Nominal GDP is 2400 billion and real GDP 2000 billion this year; real GDP last year was 1900	GDP deflator = 2400 / 2000 x 100 = 120. Real growth = (2000 - 1900) / 1900 x 100 =	4

	billion. Find the GDP deflator and the real growth rate (two decimal places).	5.26 per cent, and the price level is 20 per cent above the base year.	
24	The labour force is 3,800,000 and employment is 3,610,000. Find the number of unemployed and the unemployment rate.	Unemployed = 3,800,000 - 3,610,000 = 190000. Unemployment rate = 190000 / 3,800,000 x 100 = 5.0 per cent; the employment rate is 95.0 per cent.	4