S5 Economics Practice Paper (Set 2): Price Elasticity of Demand, Consumer and Producer Surplus, Per-unit Tax Incidence and Deadweight Loss, Price Ceiling and Quota, Cost and Profit Maximisation, Factor Demand

S5 Economics | 100 marks | 75 minutes

Question 1: Price Elasticity of Demand and Total Revenue

A snack shop sells fish balls. When the price falls from $10 to $8, daily sales rise from 100 to 130 skewers.

Calculate the price elasticity of demand over this range using the arc (midpoint) method, and take the absolute value. *(6 marks)*

State whether demand over this range is elastic or inelastic, and explain. *(5 marks)*

Calculate total revenue before and after the price cut, and use elasticity to explain the direction of the change. *(4 marks)*

If the price rises from $10 to $12 and sales fall from 100 to 80 skewers, find the arc elasticity over this range and explain why elasticity can differ between price ranges for the same good. *(3 marks)*

Question 2: Equilibrium, a Per-unit Tax and Tax Incidence

In a market the demand function is Qd = 200 - 5P and the supply function is Qs = 20 + 3P, where P is in dollars and Q is in thousands of units. The government then imposes a per-unit tax of $4 collected from sellers.

Find the equilibrium price and quantity before the tax. *(5 marks)*

Find the post-tax equilibrium price, quantity and the price sellers actually keep. *(5 marks)*

Calculate how much of the tax is borne by buyers and by sellers, and the government tax revenue. *(5 marks)*

Using the elasticities at equilibrium (demand -1.286, supply 0.771), explain why sellers bear the larger share. *(3 marks)*

Question 3: Consumer Surplus, Producer Surplus and Deadweight Loss

Use the pre-tax demand and supply functions from Question 2 (Qd = 200 - 5P, Qs = 20 + 3P).

Find the consumer surplus before the tax, in thousand dollars. *(5 marks)*

Find the producer surplus before the tax, in thousand dollars. *(4 marks)*

Find the consumer and producer surplus after the tax, in thousand dollars. *(4 marks)*

Calculate the deadweight loss and state the two parts it consists of. *(4 marks)*

Question 4: Comparing a Price Ceiling with a Quota

Still using Qd = 200 - 5P and Qs = 20 + 3P. The government considers two interventions: (A) a price ceiling of $18; (B) a sales quota of 60 thousand units.

Under the $18 ceiling, find quantity demanded, quantity supplied and the shortage. *(5 marks)*

Under the 60 thousand unit quota, find the market price. *(4 marks)*

Under the ceiling buyers pay only $18 while some would pay more. Describe the non-price competition that arises and state whether the value buyers would have paid but did not is counted as consumer surplus. *(3 marks)*

Calculate consumer surplus under each intervention and judge which is better for consumers. *(4 marks)*

Question 5: Cost, Profit Maximisation and Shutdown

A perfectly competitive firm has total cost TC = 500 + 20Q + 0.5Q^2 in dollars, and the market price is $60.

Find the marginal cost function and the profit-maximising output. *(5 marks)*

Calculate the profit at that output. *(4 marks)*

If the price falls to $30, find the profit-maximising output and profit, and decide whether the firm should shut down at once. *(4 marks)*

Explain how economies of scale and external economies lower long-run average cost, giving one example of each. *(3 marks)*

Question 6: Factor Demand and Marginal Revenue Product

A firm uses only labour as a variable factor. The marginal product of the 1st to 5th worker per day is 10, 9, 7, 5 and 3 units. The product price is $50 and the daily wage is $400.

Calculate the marginal revenue product (MRP) of each worker and find the profit-maximising employment. *(6 marks)*

If the product price rises to $60, find the new employment and explain. *(4 marks)*

If the wage rises to $480 while the product price stays at $50, how does employment change? *(3 marks)*

Explain why factor demand is called a derived demand. *(2 marks)*