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Daffodil International University

Engineering Economics (ECO426)

ID: …… Section: …… CT No.: 3 Date:……..

Time: 25 minutes Obtained Marks: …… Total Marks: 15

Set A

1. A SaaS firm has a fixed cost (FC) of Tk 6,00,000 per month and a variable cost (v) of Tk 0.50 per user. Using the break-even formula, calculate the exact number of paying users required to break even if the subscription price is Tk 50 per user per month. **[3]**
2. State the profit-maximizing conditions for a firm. **[2]**
3. Justify graphically that a perfect competitive firm can earn normal profit. **[5]**
4. An oligopolistic tech firm faces a planned demand curve of Q = 1200 − 60P (if rivals do not respond) and an actual demand curve of Q′ = 600 − 20P (if rivals match price changes). **[2+3]**
   a) Find the equilibrium price (P*) and quantity (Q*) at the kink point.
   b) Determine the exact range of marginal cost (MC) over which this price will remain rigid.

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Set B

1. A SaaS firm has a fixed cost (FC) of Tk 4,00,000 per month and a variable cost (v) of Tk 0.70 per user. Using the break-even formula, calculate the exact number of paying users required to break even if the subscription price is Tk 60 per user per month. **[3]**
2. Differentiate between accounting profit and economic profit. **[2]**
3. Justify graphically that a monopoly firm can earn supernormal profit. **[5]**
4. A competitive firm's short-run cost function is $C = \frac{1}{3}Q^3 - 30Q^2 + 800Q + 21000$. The market price is P = 400. **[3+2]**
   a) Does the firm earn an economic profit in equilibrium?
   b) Should the firm continue operating in the short run?

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ID: ..... Section: ..... CT No.: 3 Date:.....

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Set C

1. A SaaS firm has a fixed cost (FC) of Tk 3,00,000 per month and a variable cost (v) of Tk 0.60 per user. Using the break-even formula, calculate the exact number of paying users required to break even if the subscription price is Tk 60 per user per month. **[3]**
2. Contrast the economic and engineering definitions of cost. **[2]**
3. Explain the concept of price rigidity using the Kinked Demand Curve model. **[5]**
4. A monopolist faces the demand function, $P = 1000 - 2Q$ and the total cost function, $TC = 50 + 20Q$. **[3+2]**
   a) Determine monopoly price, output, and profit.
   b) Compare the monopoly equilibrium with the perfectly competitive equilibrium.

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Engineering Economics (ECO426)

ID: ..... Section: ..... CT No.: 3 Date:.....

Time: 25 minutes Obtained Marks: ..... Total Marks: 15

Set C

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Time: 30 minutes Obtained Marks: …… Total Marks: 15

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Set D

1. A SaaS firm has FC = Tk 8,00,000 per month, v = Tk 100 per user, P = Tk 600 per user. Compute the break-even quantity and break-even revenue for the firm. **[3]**

2. Differentiate between revenue and a cash inflow. Why is a Tk 50 lakh angel investment considering a cash inflow rather than revenue? **[3]**

3. Justify graphically that a monopoly firm can earn supernormal profit. **[4]**

4. A firm operating in a perfectly competitive market faces a constant market price of Tk 600. Total cost function is $TC=2Q^2+100Q+15,000$, which makes its marginal cost MC = 100 + 4Q. Using the profit-maximization rule: **[2+3=5]**

a) Calculate the firm's optimal output (Q*).

b) At this output level, determine whether the firm is earning a supernormal profit, normal profit, or incurring a loss. Calculate the firm's total profit (or loss) at the optimal output level.

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Set-E

1. A SaaS firm has a fixed cost (FC) of Tk 6,00,000 per month and a variable cost (v) of Tk 0.50 per user per month. The firm charges a subscription price (P) of Tk 50 per user per month. **[3]**

a) Using the break-even formula, calculate the exact number of paying users required for the firm to break even.

b) Calculate the break-even revenue at the break-even quantity.

2. Compare the "Freemium" and "API Pricing" software revenue models. which real-world companies utilize them? **[3]**

3. Justify graphically that a perfect competitive firm can earn normal profit. **[4]**

4. An oligopolistic firm faces two types of demand: 1. Planned demand (rivals do not respond to price changes): $Q = 800 - 50P$ and 2. Actual demand (rivals respond to price changes): $Q' = 400 - 10P$. **[2+3=5]**

a) Find the equilibrium price (P*) and quantity (Q*) at the kink point.

b) Determine the exact range of marginal cost (MC) over which this price will remain rigid