Microeconomics
Exam

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Instructions

You have 1 hour to answer all questions. Each question is worth 10 points (2 points for each bulletpoint). In addition, there is a bonus question in one of the exercises so that you can reach a total of 32 points.

Exercise 1 (10 points)

Consider the production function of a furniture factory that uses wood (W) and steel (S):

$$F = \sqrt[3]{WS}$$

with $p_w = 30$ and $p_s = 6$. Do the following points:

(a) Represent, mathematically and graphically, the isocosts set. Discuss briefly its meaning (put W on the x-axis). (2 points)

(b) Represent, mathematically and graphically, the isoquant set. Discuss briefly its meaning (put W on the x-axis). (2 points)

(c) Obtain the total cost function TC, discussing the process to get there. (2 points)

(d) Find the inverse and direct supply functions of the firm.

(e) Compute the optimal quantity produced and the profit assuming $p = 3240$. (2 points)

(f) Derive the average cost function AC and the marginal cost function MC, draw them. (**Bonus - 2 points**)

Exercise 2 (10 points)

Consider the following consumer's preferences:

$$U(X,Y) = X^{\frac{2}{3}}Y^{\frac{1}{3}}$$

In addition, $p_x = 20$ and $p_Y = 6$, while $I = 180$.

(a) Represent, mathematically and graphically, the budget constraints set. Discuss briefly its meaning. (2 points)

(b) Represent, mathematically and graphically, the indifference curves set. Discuss briefly its meaning. (2 points)

(c) Determine the optimal consumption bundle and draw it. (2 points)

(d) Supposing a new price $p'_x = 28$, find the new optimal bundle, mathematically and graphically. (2 points)

(e) Decompose the Total Effect in IE and SE using the Hicks' methodology. Also, represent this decomposition graphically. (2 points)

Exercise 3 (10 points)

Consider a monopoly where the demand curve is:

$$Q(P) = \frac{161}{4} - \frac{23}{12}P$$

and the total cost function is:

$$TC(Q) = \frac{10Q^2}{3}$$

Do the following points:

(a) Describe the total cost function and where it comes from. (2 points)

(b) Describe and compute the AC(Q), MC(Q), AR(Q) and MR(Q) functions of the monopolist;

(c) Obtain the optimal supplied quantity and optimal price the monopolist implements;

(d) Compute the profit;

(e) Compute the consumers' surplus and the producer's surplus.