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Name.....

Reg. No.....

SIXTH SEMESTER B.A. DEGREE EXAMINATION, MARCH/APRIL 2016

(UG-CCSS)

Economics

EC 6B 11—MATHEMATICAL ECONOMICS AND ECONOMETRICS

(2013 Admissions)

Time : Three Hours

Maximum : 30 Weightage

Part A

Answer all questions.

1. Given the demand function $D = 200 - X$, the marginal demand is :

- (a) -10 . (b) -1 .
(c) $-X$. (d) 1 .

2. Given the iso-utility function $U^0 = XY$, the marginal rate of substitution of X for Y is :

- (a) $-\frac{Y}{X}$. (b) $\frac{Y}{X}$.
(c) $-\frac{X}{Y}$. (d) $\frac{X}{Y}$.

3. In the optimisation format $L = f(x, y) + \lambda[M - \phi(x, y)]$ where $f(x, y)$ is the utility function, $M - \phi(x, y) = 0$, the budget constraint and λ , the Lagrange multiplier, λ stands for the :

- (a) Marginal utility. (b) Marginal budget share.
(c) Marginal expenditure. (d) Marginal utility of money.

4. The function $Q = 2K + 3L$ belongs to the class of _____ production function :

- (a) Fixed coefficient. (b) Variable coefficient.
(c) Constant elasticity. (d) Variable elasticity.

5. The elasticity coefficient of the demand function $D = a - bP$ is :

- (a) $-b\frac{D}{P}$. (b) $b\frac{D}{P}$.
(c) $-b\frac{P}{D}$. (d) $b\frac{P}{D}$.

Turn over

6. When $K_t = 500$ and $K_{t-1} = 350$ are stock of capital respectively during the current period and the past period, the investment, I_t is :
- (a) - 150. (b) 150.
(c) 0.7. (d) 10/7.
7. When the marginal product, $MP = 120$ and the average product, $AP = \text{Rs. } 20$ at particular level of output the output elasticity at that level of output is:
- (a) 100. (b) 1/6.
(c) 6. (d) 140.
8. Which of the following is a linear homogeneous production function ?
- (a) $Q = XY$. (b) $Q = X + Y$.
(c) $Q = X / Y$. (d) $Q = Y / X$.
9. Which of the following is not using derivatives as an optimisation technique ?
- (a) Simplex method. (b) Kuhn-Tucker method.
(c) Big M method. (d) Lagrange multiplier method.
10. Given the Cost equation, $C = X - 0.2 X^3$, the average cost is :
- (a) $1 - 0.2X^2$. (b) $1 - 0.6X^2$.
(c) $X - 0.2X^2$. (d) $X - 0.1X^2$.
11. The Optimal value in a linear programming problem is an element belonging to :
- (a) Universal Set. (b) Power Set.
(c) Convex Set. (d) Concave Set.
12. If the total revenue under perfect competition is given by $R = PQ$ then the marginal revenue is given by :
- (a) P. (b) Q.
(c) P / Q . (d) Q / P .

(12 × ¼ = 3 weightage)

Part B (Short Answer Type Questions)

Answer all questions.

13. Define a function.
14. Define Marginal rate of technical substitution.
15. What is elasticity of substitution ?
16. What do you mean by optimisation ?

17. Define linear homogeneous function.
18. What are the mathematical conditions for maximisation?
19. What is equilibrium ?
20. Define discriminating monopoly.
21. What is producer's surplus ? Explain.

(9 × 1 = 9 weightage)

Part C (Short Essay/Paragraph Type Questions)

Answer any **five** questions out of seven.

22. Show that the slope of a standard isoquant is negative.
23. Given the demand function $Q_1 = P_1^\alpha P_2^\beta$, where P_1 and P_2 are own price and price of related good obtain own price and cross price elasticity coefficients.
24. Find the level of maximum output given the production function $Q = xy$ and the cost constraint is $50x + 100y = 500$, by applying the substitution method.
25. Explain the simplex method.
26. When the total revenue under monopoly is given by $R = PQ$, where P and Q are variable price and quantity, show that marginal revenue depends on the average revenue and price elasticity of demand ?
27. Establish the relationship between average and marginal products.
28. Examine the Euler's theorem for homogeneous function.

(5 × 2 = 10 weightage)

Part D Essay Questions

Answer any **two** questions out of three.

29. Given the utility function, $U = x_1 x_2$ and the budget constraint, $2x_1 + 5x_2 = 100$ derive the quantity demanded for two goods assuming that utility is maximised subject to the constraint.
30. Given the Cobb-Douglas production function $Q = AK^\alpha L^\beta$ state and explain any of the five properties.
31. The demand and supply equations in three prices in a perfectly competitive market are given as below :

$$D_1 = 20 - P_1 + 2P_2 + P_3$$

$$S_1 = 10 + P_1$$

$$D_2 = 5 - 2P_2$$

$$S_2 = 3P_2 - P_1$$

$$D_3 = 20 + P_1 - 0.5P_3$$

$$S_3 = 5 - P_2 + P_3$$

Solve the system and obtain the equilibrium price vector.

(2 × 4 = 8 weightage)