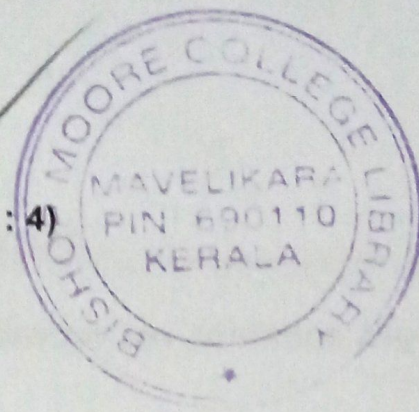


(Pages : 4)



M – 4428

Reg. No. :

Name :

Fourth Semester B.A. Degree Examination, February 2022

First Degree Programme under CBCSS

Economics

Core Course IV

EC 1441 – MATHEMATICAL METHODS FOR ECONOMICS

(2019 Admission)

Special Examination

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer all questions. Each question carries 1 mark.

1. Differentiation
2. Capital formation
3. Identity Matrix
4. Vector
5. Homogeneous function
6. Differentiate: $y = 3x^5 + 2x^3$
7. Arc elasticity
8. Iso-cost line
9. Lagrange multiplier
10. Simultaneous equation

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer any **eight** questions not exceeding **one** paragraph. Each question carries **2** marks.

11. Find out the MR for the demand function $P = 30 - 2x^2$.
12. What are the properties of a linear function?
13. How do you find the relative extrema of a function?
14. Find the maximum and minimum values of the function:
 $F(x) = y = x^3 + 2x^2 - 4x + 6$.
15. Explain the concept of consumer's surplus
16. Write a note on Cramer's rule.
17. Explain the relationship between Mathematics and Economics.
18. Find the relative maximum and/or minimum values of the following function.

$$y = 2x^2 - 4x + 10$$

19. The total cost function of a commodity is: $C = 0.5x^2$ Where C is the total cost of producing a quantity x. Find the average cost (AC) and Marginal Cost.
20. Write a note on the concept of limit under differential calculus.
21. Given the simultaneous equations.

$$x + 3y = 4 \quad (1)$$

$$-x + 2y = 6 \quad (2)$$

Solve for x and y algebraically.

22. Consider the following market demand and supply functions for a commodity

$$Q_d = 20000 - 400P$$

$$Q_s = -4000 + 800P$$

Determine the equilibrium price and quantity.

23. Differentiate: $y = \frac{1+x^2}{2-x^3}$

24. Explain the difference between an exponential function and power function.
25. Explain the constrained optimisation.
26. Solve the quadratic equation $3x^2 + 7x + 2 = 0$ by the standard formula method.

(8 × 2 = 16 Marks)

SECTION – C

Answer any **six** questions not exceeding 120 words. **Each** question carries **4** marks.

27. Explain the relationship between total, marginal and average concepts in Economics.
28. Given the marginal cost function: $MC = ax^2 + bx$. Find the total cost and average cost functions.
29. What is meant by optimization? State the two conditions for obtaining optimum value of a function.
30. What are the properties of matrix multiplication?
31. The demand function for a commodity $P=30-2D$. The supply function $P=3D$. Find consumer's surplus.
32. A firm has the following total cost function
- $$TC(Q) = Q^3 - 24Q^2 + 200Q + 500$$
- (a) What is this firm's fixed cost?
- (b) At what level(s) of output does the firm's marginal cost equal \$50?
33. Given the marginal cost function: $MC = ax^2 + bx$. Find the total cost and average cost functions.
34. Briefly explain co-ordinate geometry which include graphs, slopes and intercept.
35. Explain definite and indefinite integral.

36. Write a note on implicit differentiation.
37. Explain the properties of determinants.
38. Explain homogeneous production function.

(6 × 4 = 24 Marks)

SECTION – D

Answer any **two** questions not exceeding four pages each. **Each** carries **15** marks.

39. Determine the optimal level of production for a monopolist whose demand function is $Q = 50 - 0.5P$ and his total cost function is $C = 50 + 40Q$. Also, what is the maximum profit earned by the monopolist at that point?
40. Assume a firm has the production function $Q = 2.5K^{0.4}L^{0.5}$. If this firm employs 15 units of labour and 20 units of capital and the price of the good in the market is \$ 100 per unit, find the following:
 - (a) Marginal product of labour and capital.
 - (b) Marginal revenue product of labour and capital.
 - (c) Average product of labour and capital.
41. Evaluate the determinant of the following matrices:

$$A = \begin{bmatrix} 0 & -5 & 2 \\ 4 & 1 & 0 \\ 8 & 5 & 9 \end{bmatrix}$$

42. Write an essay on the economic applications of integral calculus.
43. Define integration. What are the rules of integration?
44. What are the different types of functions? Explain the various economic functions.

(2 × 15 = 30 Marks)