QP CODE:
T6029

Enrollment Number: ……

Name: ……

BA DEGREE EXAMINATIONS, MAY 2024

Second Semester

B.A. Economics

B21EC02DC - Mathematics for Economics

(2023 January admissions)

Time: 3 Hours **Max Marks: 70**

Section A

Answer any ten of the following questions in a word or sentence each. Each question carries 1 mark.

1. Show that (x-2) is a factor of the polynomial of x^3-4x^2+8
2. Define Unit matrix.
3. What is 70% of 25?
4. Simplify $\frac{2^5\times2^2}{2^3\times2^1}$
5. Find the multiplicative inverse of ½
6. Find the LCM of 24 ,36.
7. What is the value of the determinant when all elements of a row or column are zeros?
8. What are the conditions for equality of two matrices?
9. Define Marginal Propensity to Consume.
10. Evaluate the integral $\int(e^x+2)\,dx$
11. Find the transpose of the matrix A = [2 4 1 0]
12. Find marginal cost of x, if TC = $2x^3+3x^2+5$
13. Find the partial derivative of the function z = 4xy + x with respect to x.
14. Find d^2y/dx^2 for $y=3x^5+8x$
15. What happens to the slope of the curve just after it reaches the maximum point?

(1X10=10)

Section B

Answer any ten of the following questions in two or three sentences each. Each question carries 2 marks.

16. Solve the quadratic equation $6x^2+7x-3$

17. Find the Trace of the matrix $\begin{bmatrix} 1 & 2 & -1 \\ 3 & 4 & 0 \\ 1 & 0 & 2 \end{bmatrix}$

18. Given A = [1 0 2] Find 3A.

19. Explain the quotient rule of differentiation with an example.

20. State the conditions for any function f(x) to be continuous.

21. Let the matrix A = $\begin{bmatrix} x-5 & 4 & 3 \\ 2 & 4 & 8 \\ 3 & 2 & 5x \end{bmatrix}$ and the trace of matrix A is 12. Find the value of x.

22. Find the derivative of $y = x^2 \log x$

23. Find the value of the determinant $\begin{vmatrix} 3 & 1 & 2 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$.

24. Define partial derivatives.

25. Find the eigen values of the matrix $\begin{bmatrix} 5 & 4 \\ 3 & 6 \end{bmatrix}$

26. Explain first order derivative and second order derivative.

27. What is Average Propensity to Consume?

28. The marginal cost function of manufacturing Q units of a commodity is $5- 4x-x^2$. If the fixed cost is 100, find the total cost and average cost functions.

29. State the rules of integration.

30. Find the co-factor of 20 in the matrix $\begin{bmatrix} 10 & 25 \\ 20 & 5 \end{bmatrix}$

(2X10=20)

Section C

Answer any five of the following questions in a paragraph each. Each question carries 4 marks.

31. Evaluate $\int 3 (e^{2x} + x) (e^{2x} + x^2) dx$.

32. Define adjoint of a matrix using an example.

33. What are the properties of arithmetic operations on a set?

34. If we have the relation C = 5 (F-32) where C and F are the units of temperature in Celsius and Fahrenheit. Find C when F = 54 and F when C = 23. Find a general expression for F in terms of C.

35. Evaluate $\text{Lt}_{x \to 0} \frac{\sqrt{x+16}-4}{x}$

36. Explain the various uses of matrices in economics.

37. Describe the relationship between MP, AP, TP in the production process.

38. Find the second order partial derivative $\frac{d^2y}{dx^2}$ where $y = 2x^2 + 3y^2 + 4xy$

39. If A = $\begin{bmatrix} 6 & -x^2 \\ 2x - 15 & 10 \end{bmatrix}$ is symmetric, then what is the value of x?

40. Explain the Rules of Differentiation.

(4X5=20)

Section D

Answer any two of the following questions in 300 words each. Each question carries 10 marks.

41. Solve the linear equations using Cramer's Rule

    x + y - z = 6, 3x - 2y + z = -5 and x + 3y - 2z =14

42. What is definite integral and how do you interpret it geometrically also state its properties.

43. Mathematically illustrate and explain the concept of consumer surplus and producer surplus.

44. The marginal revenue and marginal cost function of a firm are given by $100+20q+3q^2$ and $2q+4$.

    Find Total Revenue and Total Cost incurred by the firm, also obtain the profit when output is 10 units.

(10X2=20)