QP CODE

A4037

Enrollment Number: ……

Name: ……

B.A. DEGREE EXAMINATIONS, DECEMBER 2024
Second Semester
B.A. Economics
B21EC02DC – Mathematics for Economics
(2023 July 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. What is the difference between rational and irrational numbers..
2. Define Trace of a matrix with example.
3. Find the Marginal Revenue function of the firm given the total revenue function R= 21-x^2
4. What is the nature of the quadratic equation if the discriminant is zero?
5. Find $\frac{3(x-1)}{(x+1)+(x+2)}$ when x = 3
6. Show that $x - 3$ is a factor the polynomial, $f(x) = x^3 + x^2 - 17x + 15$.
7. What is an improper fraction.
8. Define a skew symmetric matrix
9. Evaluate the integral $\int(x^5 + 20)\, dx$.
10. Given Q= 40-10L-L^2, Find Marginal Productivity of Q with respect to Labour, MPL
11. Define Eigen values
12. Examine whether the function y = 120 − 6x is convex or concave.
13. Find $\lim_{x\to 2} \frac{x^2-3x+2}{x^2-5x-6}$
14. If X=$\begin{bmatrix} 2 & 1 & 0 \\ 3 & 2 & 1 \\ 5 & 4 & 1 \end{bmatrix}$ and Y =$\begin{bmatrix} 2 & 5 & 4 \\ 8 & 7 & 6 \\ 0 & -1 & 3 \end{bmatrix}$ $Find\ 3X - 2Y$
15. Solve x^2+2x-5 =0

(1X10=10)

Section B

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

16. State any two properties of algebraic expression

17. Define Crammers Rule
18. Show that A= $\begin{bmatrix} 3 & 4 & 0 \\ 0 & -1 & 3 \\ 2 & -2 & 8 \end{bmatrix}$ is non singular
19. Given demand function p=10-5q Find elasticity at p=2.
20. Define Producers Surplus.
21. Integrate $\int_0^4 (5x + 3)\, dx$
22. Given $Z=X^3-2X^2Y+5XY^2+Y^3$ Find partial derivatives of Z with respect to X and Y.
23. Find the Adjoint of A= $\begin{bmatrix} 1 & 2 \\ 5 & 0 \end{bmatrix}$
24. How are definite and Indefinite integral different, illustrate with example.
25. What is the relation between AR,MR and Elasticity Explain.
26. If α *and* β are the roots of the equation $x^2 - px + q = 0$. Find the value of $\alpha^2\beta + \alpha\beta^2$
27. If Marginal Revenue MR=100-8q, when q=10 Find the Total Revenue TR.
28. Find the second order derivative of y= xlogx
29. Find the AB when A= $\begin{bmatrix} 2 & 1 & 5 \\ 4 & 3 & 2 \\ 1 & 1 & 0 \end{bmatrix}$ *and* $B = \begin{bmatrix} 1 & 2 \\ 3 & 0 \\ 1 & -1 \end{bmatrix}$
30. State the properties of Determinants.

(2X10=20)

Section C

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

31. Solve the set of equations 2x – y = 5,3x - 4y = 10
32. Let Matrix A= $\begin{bmatrix} -14 & 6 \\ 8 & 10 \end{bmatrix}$ and eigenvalue λ = -12. Find the eigenvector
33. Explain the application of Calculus in Economics
34. . Find the rank of the matrix A = $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 6 & 9 \\ 2 & 4 & -6 \end{bmatrix}$
35. The total revenue function of a firm is given as TR = $21x-x^2$. Find output at which TR is Maximum.
36. Find the maximum and minimum of the function $y=x^3-6x^2+9x+5$
37. Evaluate $\int x(x^2-2)^2\, dx$ by substitution method
38. Explain the different rules of Integration.
39. Find MRTS when x=2 and y=3, if the production function Q= $3x^2+2xy+y^2$.

40. Briefly explain the relation between AR and MR in Perfect Competition.

(4X5=20)

Section D

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

41. Find the cost function if $MC=2q-3q^2-2$,where q is the quantity produced. It is known that TFC=200 when q=10, Also Obtain the Average cost Function.
42. Explain the application of matrices in Economics.
43. Explain in detail the types or degree of price elasticity of demand.
44. Solve the simultaneous equations using Crammer's Rule

    $3x+ y + z=8$

    $x+y+z=6$

    $2x+y-z=1$

(10X2=20)