A1031

Name.....

Register No.....

NAIPUNNYA INSTITUTE OF MANAGEMENT AND INFORMATION TECHNOLOGY (AUTONOMOUS)

FIRST SEMESTER (FYUG) DEGREE EXAMINATION NOVEMBER 2025

COMPUTER APPLICATION

BCA1CJ102 - MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Time:Two Hours | Maximum:70 marks

Section A

Answer all questions.

Each question carries 3 marks. Ceiling 24 marks

1. Define a Diagonal Matrix. CO1

2. State the definition of an indefinite integral and explain the meaning of the constant of integration. CO5

3. Differentiate $y = \sqrt{tanx}$. CO4

4. Evaluate $\int_0^{\pi/2} sinx\, dx$. CO5

5. Explain the difference between an indefinite integral and a definite integral. CO5

6. Given $y = sinx + cosx, find\ \frac{dy}{dx}$ CO4

7. Determine whether the vectors (1,2,3), (2,4,6) and (3,6,9) are linearly independent. CO2

8. Differentiate between the derivative of a function and the derivative at a point. CO5

9. Find the derivative of sin^2x. CO3

10. Find the cross product of P=(1,2,3) and Q=(4,5,6). CO2

Section B

Answer all questions.

Each question carries 6 marks. Ceiling 36 marks

11. Find $\lim_{x \to \frac{\pi}{2}} \frac{tan\theta}{sec\theta}$ CO5

12. Evaluate $\int (2x^2 - 1)(x - 1)dx.$ CO5

13. Find the eigen value of the matrix A= $\begin{bmatrix} 1 & 2 \\ 4 & 9 \end{bmatrix}$. CO2

Turn Over

14.Solve the system using Gauss Jordan Method:

$$x + y + z = 9$$
$$2x + 3y + 7z = -6$$
$$x - y - z = 3$$

CO3

15. Evaluate $\int cos^2 x \, dx$. CO4

16. Compute the cross product of P = (1,2,3), Q = (4,0, −2) and verify that it is perpendicular to both P and Q. CO3

17.If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ -1 & 1 & 2 \end{bmatrix}$ $and\ B = \begin{bmatrix} 0 & 2 & -1 \\ 1 & 3 & 4 \\ 0 & -2 & -3 \end{bmatrix}, show\ that\ AB \neq BA.$ CO1

18. Find $\frac{dy}{dx}, if\ y = e^x \log(sin2x)$. CO5

Section C

Answer any one question
The question carries 10 marks.

19. Evaluate $\frac{dy}{dx}$, if y= $(\sin x)^{\cos x} + (\cos x)^{\sin x}$. CO4

20. For U = (2,3,4) and V = (−1,2,1)

(a) Find U + V

(b) Compute the angle between them using the dot product. CO2

****