

Roll No.

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Paper ID [A0211]

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**BCA (301)/B.Sc.(IT - 404) (S05) (O/N) (Sem. - 3rd)
MATHS - II (COMPUTER ORIENTED METHODS)**

Time : 03 Hours**Maximum Marks : 75****Instruction to Candidates:**

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Nine** questions from Section - B.

Section - A**Q1)****(15 × 2 = 30)**

- a) If $\begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix} = \begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix}$, find the value of x, y, z and w .
- b) Evaluate $\left(\begin{bmatrix} 1 & 3 \\ -1 & -4 \end{bmatrix} + \begin{bmatrix} 3 & -2 \\ -1 & 1 \end{bmatrix} \right) \begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \end{bmatrix}$.
- c) Find rank of the following matrix $\begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{bmatrix}$.
- d) If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I = 0$, where I is a unit matrix.
- e) Using matrix, find the area of a triangle with vertices (3,8), (-4,2) and (5,1).
- f) Find the mean of the data 65, 58, 68, 44, 48, 45, 60, 62, 60 and 50.
- g) Write a short note on kurtosis of data.
- h) Find the geometric mean of 50, 100, 1920, 143740.
- i) Find $\frac{dy}{dx}$ if $ax^2 + 2hxy + by^2 + 2fx + 2gy + c = 0$.
- j) If $(x)^y = (y)^x$, find $\frac{dy}{dx}$.

- k) Evaluate $\int \sqrt{1+\cos 2x} dx$.
- l) Evaluate $\int \frac{\cos \theta}{(2+\sin \theta)(3+4 \sin \theta)} d \theta$.
- m) Evaluate $\int_0^{2 \pi} \cos^5 x dx$.
- n) Evaluate using properties of definite integral $\int_1^3 \frac{\sqrt{4-x}}{\sqrt{x}+\sqrt{4-x}} dx$
- o) Give Simpson's 1/3 rule of numerical integration.

Section - B

(9 × 5 = 45)

Q2) If $A = \begin{bmatrix} 2 & 6 & 8 \\ 5 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 \\ 2 & 2 \\ -4 & 1 \end{bmatrix}$, verify that $(AB)^T = B^T A^T$.

Q3) Solve following system of equations by Gauss Jordan method
 $2x - y + 3z = 5$; $3x + 2y - z = 5$ and $4x + 5y - 5z = 9$

Q4) Express matrix $A = \begin{bmatrix} 3 & -1 & 0 \\ 2 & 0 & 3 \\ 1 & -1 & 2 \end{bmatrix}$, as sum of a symmetric and skew symmetric matrix.

Q5) Find the inverse of the matrix $\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

Q6) Differentiate with respect to x , $\tan^{-1} \left(\frac{\sqrt{1+x^2}-1}{x} \right)$.

Q7) Find $\frac{dy}{dx}$ if $x = a(1 - \cos \theta)$ and $y = a(\theta + \sin \theta)$.

Q8) Show that the semi vertical angle of a cone of maximum volume and of given slant height is $\tan^{-1} \sqrt{2}$.

Q9) The first of two samples has 100 items with mean 15 and standard deviation 3. If the whole group has 250 items with mean 15.6 and standard deviation of $\sqrt{13.44}$, find mean and the standard deviation of the second group.

Q10) Evaluate $\int \frac{2x-1}{(x-1)(x+2)(x-3)} dx$.

Q11) Prove that $\int_0^{\pi/2} \log(\cos x) dx = -\frac{\pi}{2}(\log 2)$.

Q12) Evaluate $\int_a^b x^2 dx$ as the limit of sum .

Q13) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ using Trapezoidal rule.

