

Roll No. ....

Total No. of Questions : 13]

[Total No. of Pages : 03

## Paper ID [A0211]

(Please fill this Paper ID in OMR Sheet)

BCA (301)/B.Sc.(IT - 404) (S05) (O/N) (Sem. - 3<sup>rd</sup>)  
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  $\frac{dy}{dx}$ .

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- 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.

