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**Paper ID [B0217]**

(Please fill this Paper ID in OMR Sheet)

**BCA (Sem. - 4<sup>th</sup>)****MATHEMATICS - II (Computer Oriented) (BC -301)****Time : 03 Hours****Maximum Marks : 60****Instruction to Candidates:**

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

**Section - A****Q1)****(10 × 2 = 20)**

- a) Define transpose and adjoint of a matrix.
- b) Under what conditions is the matrix equation  $A^2 - B^2 = (A - B)(A + B)$  true?
- c) Show that weighted arithmetic mean of first 'n' natural numbers, whose weights are equal to the corresponding numbers is equal to  $2n + 1/3$ .
- d) The median of eight observations 31, 48, 37, 34, 45, 36, 41 and x is 38 where  $37 < x < 41$ . Find the value of x.

e) Show that  $\int_0^{\pi/2} \sin 2x \log \tan x \, dx = 0$ .

f) Evaluate  $\int_{-\pi/4}^{\pi/4} \sin^2 x \, dx$ .

- g) Write the method to find minima of one variable function.
- h) Find the derivative of 2<sup>nd</sup> order of  $e^{x \sin x}$ .
- i) Define Simpson's  $\frac{1}{3}$  rule.
- j) Define Trapezoidal rule.

**E - 847 [1208]****P.T.O**

## Section - B

(4 × 10 = 40)

Q2) Solve the following system of equations by Gauss elimination method.

$$2x - y + 3z = 8, -x + 2y + z = 4, 3x + y - 4z = 0.$$

Q3) It is given that  $\sum fx' = 100, \sum fx'^2 = 400, \sum fx'^3 = -1,000, \sum fx'^4 = 5,000$  and  $N = 10$ . Find first four central moments.

Q4) If  $y = \log(1 + \cos x)$  show that  $\frac{dy}{dx} \frac{d^2y}{dx^2} + \frac{d^3y}{dx^3} = 0$ .

Q5) Evaluate  $\int_0^{\pi/2} \frac{x \tan x}{\sec x \operatorname{cosec} x} dx$ .

Q6) Evaluate  $\int_{0.2}^{1.4} (\sin x - \log_e x + e^x) dx$  by Trapezoidal and Simpson's  $\frac{3}{8}$  rule.

Q7) Find the rank of a matrix A

$$A = \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & -1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & -1 \end{bmatrix}$$

