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Total No. of Questions : 07

BCA (Sem.–4th)
MATHEMATICS II (COMPUTER ORIENTED MATHEMATICS)
Subject Code : BC-301
Paper ID : [B0227]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY.**
2. **Attempt any FOUR questions from SECTION-B.**

SECTION-A **(10 × 2 = 20 Marks)**

l. Write short notes on :

(a) Give merits and demerits of median.

(b) A cyclist pedals from his house to his college at a speed of at 15 km/hr. Find the average harmonic mean speed.

(c) Define diagonal and scaler matrices. Also give difference between these matrices.

(d) Prove that $f(x) = |x|$ is not differentiable at origin.

(e) Differentiate $(x^4 - 3)(x^2 + 2x + 1)$, w.r.t x.

(f) Find $\int x \sin x^2 \, dx$.

(g) Find $\frac{dy}{dx}$, where $y = \tan(\cos x)$.

$$\int \quad 2 \qquad 2$$

(i) Evaluate $\int_{}^{\pi/2} 2\sin^2 x dx$.

(j) Define Simpson's $\frac{3}{8}$ rule.

SECTION-B **(4 × 10 = 40 Marks)**

2. (a) Given that $A = \begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 0 \\ 7 & 1 \end{bmatrix}$, then show that $(AB)^T = B^T A^T$.

   (b) Find the inverse of the matrix $\begin{bmatrix} 2 & 5 & 3 \\ 3 & 1 & 2 \\ 5 & 2 & 1 \end{bmatrix}$.

3. (a) Solve by Gauss Jordon method : $y + z = 4$, $x + z = 5$, $x + y = 6$.

   (b) Find the maximum and minimum value of $2x^3 - 15x^2 + 36x + 10$.

4. (a) Calculate the mode from the following data :

X :	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
f :	5	8	7	12	28	20	10	10

ge and mean deviation.

5. Find the derivative of (i) x^{x^2} (ii) $\sin\sqrt{(1-x^2)}$.

6. Evaluate (i) $\int \frac{\tan x}{\sec x + \tan x} dx$ (ii) $\int \frac{1}{(x^2 - 3x + 2)} dx$.

7. Evaluate I = $\int_0^1 \sqrt{(1-x^2)}\, dx$ by (i) Trapezoidal rule (ii) Simpson's $\frac{1}{3}$ rule.

   (Take $h = 0.25$)