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BCA (Sem. - 4th)
MATHEMATICS - II
(Computer Oriented Methods)
SUBJECT CODE : BC-301 (N2) (Batch 2k3 Onwards)
Paper ID : [B0227]

[Note: Please fill subject code and paper ID on OMR]

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) Solve the matrix equation $\begin{bmatrix} x^2 \\ y^2 \end{bmatrix} - 3\begin{bmatrix} x \\ 2y \end{bmatrix} = \begin{bmatrix} -2 \\ 9 \end{bmatrix}$.

b) If $A = \begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$ and B = [1 3 –6]; verify that (AB)' = B' A'.

c) Give algorithm of Gauss Elimination method.

d) Find Geometric and Harmonic mean of : 5, 10, 15.

e) Explain the concept of skewness.

f) Find dy/dx; if $y = x^y$.

g) Differentiate $\tan^{-1}\left[\sqrt{\frac{1-\cos x}{1+\cos x}}\right]$.

h) Evaluate $\int \frac{\sin(x-a)}{\sin x} dx$.

i) Evaluate $\int \frac{(x+1)e^x}{\sin^2(xe^x)} .dx$.

j) Give the formula of Trapezoidal rule.

Section - B

(4 × 10 = 40)

Q2) (a) If $A = \begin{bmatrix} 2 & -1 & 3 \\ -3 & 2 & 0 \\ 5 & 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} -3 & 2 & -1 \\ 0 & 5 & 2 \\ 1 & -2 & 1 \end{bmatrix}$; If AB = BA?

(b) Find rank of the matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$.

Q3) (a) Apply Gauss Jordan method to solve the equations:

$x + y + z = 9$, $2x - 3y + 4z = 13$ & $3x + 4y + 5z = 40$

(b) Solve by matrix inversion method:

$x + 3y + 3z = 1$, $x + 4y + 3z = 0$ & $x + 3y + 4z = 2$

Q4) (a) Find out the average height of a plant in a certain garden from the following data:

Height (in cm)	No. of plants	Height (in cm)	No. of plants
66	1	71	1
67	2	72	2
68	4	73	1
69	3	74	1
70	2	75	1

(b) The first four moments of a distribution about the value 0 are –0.20, 1.76, –2.36, 10.88. Find moments about mean.

Q5) (a) Find $\frac{dy}{dx}$; if $(\cos x)^y = (\cos y)^x$.

(b) Determine absolute maxima and minima of $f(x) = \sin x + \cos x$, $0 \le x \le \pi$.

Q6) (a) Evaluate $\int \frac{\sin x}{\sin 3x} dx$.

(b) Evaluate $\int_0^1 |3x - 1| dx$

Q7) (a) Evaluate $\int \frac{1}{a + b\cos x} dx$ $(a > b)$

(b) Evaluate $\int_0^4 e^x dx$, using Simpson's rule.

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