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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(IT) (2015 & Onwards)/BCA (2013 & Onwards) (Sem.-2)

MATHEMATICS – II

Subject Code : BSIT/BSBC-202

Paper ID : [B1114]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.

SECTION-A

1. Answer the following :

(a) Prove that $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix} = (b-a)(c-a)(c-b)$

(b) If $\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3z+w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$, then find values of x, y, z and w .

(c) Find the derivative of $y = \sin \sqrt{x}$.

(d) Find the integrals : $\int \frac{x^3 - 1}{x^2} dx$.

(e) Find the derivative of $y = (x-1)(2x-3)$.

(f) Find the mean of the following distribution.

Class	0 – 7	7 – 14	14 – 21	21 – 28	28 – 35	35 – 42	42 – 49
Frequency	19	25	36	72	51	43	28

(g) Find the integrals : $\int xe^{2x} dx$.

(h) If $\log 2 = 0.3010$ and $\log 3 = 0.4771$, find the value of $\log 12$.

(i) Evaluate $\log_3 27$.

- (j) Find the Rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 3 \\ 3 & 2 & 1 \end{bmatrix}$.

SECTION-B

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

(b) Solve the equations $2x + 3y = 10$ and $x + 6y = 4$, using Cramer's rule.

3. (a) Determine the inverse of the matrix $A = \begin{bmatrix} 1 & 5 & -2 \\ 3 & -1 & 4 \\ -3 & 6 & -7 \end{bmatrix}$.

(b) Calculate the mean, mode and median for the following :

Mid-Value	15	20	25	30	35	40	45	50	55
Frequency	2	22	19	14	3	4	6	1	1

4. (a) If the present population of a village is 10,648 and every year it increases by 5% then 3 years before, what was the population of village?
- (b) Find mean deviation about the median for the data : 5000, 4150, 3541, 2354, 2780, 3011, 3020.
5. (a) Differentiate $y = 3x - \frac{1}{\sqrt{x}} + \frac{1}{x}$, with respect to x .
- (b) Find $\frac{dy}{dx}$ from $y^2 \sin x + y \tan x + (1 + x^2) \cos x = 0$.
6. (a) Find the points of absolute maximum and minimum of $y = (x - 1)^{1/3} (x - 2)$.
- (b) Integrate $\int 2e^{6x-1} dx$.
7. (a) Evaluate $\int_1^3 \frac{1}{x} dx$ using Trapezoidal rule, taking $h = 4$.
- (b) Integrate $\int \frac{x^2}{(x^2 + 1)(x^2 + 4)} dx$.