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Roll No. I Total No. of Pages : 02 Total No. of Questions : 07 B.Sc.(IT) (2015 & Onwards)/BCA (2013 & Onwards) (Sem2) 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 $\log 27$]	_			
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(1) 2 ((i) Evaluate log	₃ 27.						

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(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% then3 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 $y = 3x \frac{1}{\sqrt{x}} + \frac{1}{\sqrt{x}}$ 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 ∫ 2e^{6x-1} dx.
- 7. (a) Evaluate $\int_{1}^{3} \frac{1}{x} dx$ using Trapezoidal rule, taking h = 4.

(b) Integrate
$$\int \frac{x^2}{(x^2+1)(x^2+4)} dx$$
.

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