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Total No. of Pages : 03

Total No. of Questions : 07

B.Sc.(IT) (2015 Batch) / BCA (2011 & 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 has to attempt any FOUR questions.

SECTION-A

1. Write briefly :

(a) If $A = \begin{bmatrix} 5 & 10 & 3 \\ -2 & -4 & 6 \\ -1 & -2 & b \end{bmatrix}$ is a singular matrix. Find value of b .

(b) Evaluate $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix}$.

(c) If $A = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 6 & 10 \\ -8 & -12 & -20 \end{bmatrix}$, find rank of A.

(d) Find the mean deviation about the mean for the data : 6, 7, 10, 12, 13, 4, 8, 12

(e) Find the principal, which will amount to Rs. 1352 in 2 years at 4% compound interest.

(f) Differentiate $(x^2 - 4x + 5)(x^3 - 2)$ w.r.t. x .

(g) Differentiate $\frac{1}{x + \sqrt{1+x^2}}$ w.r.t. x .

(h) Find the maximum value of $f(x) = -(x-2)^2 + 4$, for all $x \in \mathbb{R}$.

(i) Find $\int \frac{dx}{x+x \log x}$.

(j) Evaluate $\int \frac{(x+1)(x+\log x)^2}{x} dx$.

SECTION-B

2. (a) If $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$, then show that $A^3 = A^{-1}$.

(b) Solve, by matrix method, the following equations :

$$x + 2y + 5z = 10$$

$$x - y - z = -2$$

$$2x + 3y - z = -11$$

3. (a) Solve the following system of equations by Crammer's Rule :

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4,$$

$$\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1,$$

$$\frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2.$$

(b) Find a so that rank of matrix $A = \begin{bmatrix} a & 0 & 1 \\ 1 & 2 & a \\ 1 & 2 & 3 \end{bmatrix}$ is less than 3. Also find the rank for these values of a .

4. (a) Calculate the mean and standard deviation for the following distribution :

Class :	30–40	40–50	50–60	60–70	70–80	80–90	90–100
Frequency :	3	7	12	15	8	3	2

- (b) The mean and standard deviation of 100 observations were calculated as 40 and 5.1, respectively by a student who took by mistake 50 instead of 40 for one observation. What are the correct mean and standard deviation?
5. (a) If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ show that $\frac{dy}{dx} = -(1+x)^{-2}$.
- (b) Differentiate $x^{\log x} + (\log x)^x$ w.r.t. x .
6. (a) Evaluate $\int \frac{x^2+1}{(x+1)^2} dx$.
- (b) Evaluate $\int \frac{dx}{\cos(x-a)\cos(x-b)}$.
7. (a) Evaluate $\int_0^{2\pi} \frac{\cos x}{\sqrt{4+3\sin x}} dx$.
- (b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$, using Simpson's One-third rule.