Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 16

B.Sc. (IT) (2015 & Onwards) / BCA (2014 to 2018) (Sem.–2)

MATHEMATICS-II

Subject Code : BSBC / BSIT-202

M.Code : 10051

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

Answer the following :

1. If $A = \begin{bmatrix} 2 & 3y \\ 4 & 5 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$, then find a matrix X such that $3A - 2B + 4X = 0$.

2. What positive value of x make the following pair of determinants equal?

$$\begin{vmatrix} 2x & 3 \\ 5 & x \end{vmatrix}, \quad \begin{vmatrix} 16 & 3 \\ 5 & 2 \end{vmatrix}$$

3. Differentiate $\log (x + \sqrt{x^2 + a^2})$ w.r.t. x.

4. If $\sin y = x \cos (a + y)$. Show that $\frac{dy}{dx} = \frac{\cos^2 (a+y)}{\cos a}$.

5. Define Median and Standard deviation with example.

6. Calculate the mean deviation from median and coefficient of mean deviation.

   20, 22, 25, 38, 40, 50, 65, 70, 75

7. Evaluate $\int \frac{x^3 + 3x^2 + 2x + 1}{x - 1} dx$

8. Find $\int \sin 3x \sin 2x dx$

9. Evaluate $\int_{-\pi}^{\pi} \sin^3 (x) \cos^2 x dx$

10. State Trapezoidal rule.

SECTION-B

11. For the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$, show that $A^3 - 23A - 40I = 0$. Hence find A^{-1}

12. Using matrices solve the following system of equations

$2x - 3y + 4z = 4$

$3x + y - 2z = 9$

$2x + 3y - 5z = 7$

13. a) Show that of all rectangles with a given perimeter the square has the largest area.

b) If $y = a^{xy}$ prove that $\frac{dy}{dx} = \frac{y^2 \log a}{1 - xy \log a}$

14. a) Find $\int x^2 \cot^{-1} x dx$

b) Evaluate $\int \frac{x^3 + x + 1}{x^2 - 1} dx$

15. a) Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Simpson's $\frac{1}{3} rd$ rule.

b) Find the median from the following data :

Group :	0-5	5-10	10-15	15-20	20-25	25-30	30-35
Frequency :	25	125	100	300	250	125	20

16. a) Find the Standard deviation and Mean of the marks obtained by 100 students in an examination.

Marks :	0-10	10-20	20-30	30-40	40-50
No. of students :	12	21	23	34	10

b) Write the formula for calculating Mode, Median in continuous series.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.