

**AC-234****B.C.A. I Sem. Examination, Dec. 2019****(N.C.) CBCS****(C - 105)****Mathematics - I***Time : Three Hours ]**[ Maximum Marks : 50**[ Minimum Marks : 20***Note :** Attempt any **five** questions. **All** questions carry equal marks.

1. Find the inverse of the following matrix

$$A = \begin{bmatrix} 5 & 4 & 2 \\ 2 & 4 & 3 \\ 3 & 2 & 6 \end{bmatrix}$$

2. Show that the value of a determinant remain unchanged if its rows are changed into columns and columns into rows.

3. Show that the function given by
- $f(x) = \log x$
- ,
- $x \in (0, \infty)$
- is continuous at every point of its domain.

4. Find the each of the following limits; If they exist.

(i)  $\lim_{x \rightarrow \infty} \frac{2x-1}{x+2}$

(ii)  $\lim_{x \rightarrow \infty} \frac{x^2+3}{1-x}$

5. If
- $y = \cos(m \sin^{-1} x)$
- , show that

$$(1-x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2-n^2)y_n = 0$$

**P.T.O.**

6. Trace the curve  $y^2(a^2+x^2) = x^2(a^2-x^2)$

7. Evaluate  $\int \frac{x^2-1}{x^4+1} dx$ .

8. Show that  $\int_0^{\pi/2} \sin^3 \theta \cos^4 \theta d\theta$ .

9. Show that  $A \times (B \times C) = (A \cdot C) B - (A \cdot B) C$

10. If  $\vec{a} = (2, 1, -1)$  and  $\vec{b} = (-3, 4, 1)$ , compute each of the following :

(i)  $\vec{a} \times \vec{b}$

(ii)  $\vec{b} \times \vec{a}$