

Code No. : 1282

B. C. A. (First Semester)

Examination, 2022-23

**FOUNDATION COURSE IN MATHEMATICS
FOR COMPUTING
(BCA-103T)**

Time : Three Hours] [Maximum Marks : 75

Note : (i) All questions are compulsory.

(ii) Answer each part of the first question in not more than 100 words and the remaining questions in 800 words.

(iii) Marks are mentioned against the questions.

1. Attempt all parts of the following : 3 each

(a) Define minor and cofactor.

(b) Find the differential coefficient of the following expansion :

$$y = \sec x + \cos x$$

(c) What is a symmetric matrix ? Give example.

(d) Evaluate the following :

$$\lim_{x \rightarrow -2} (3x^2 + 5x - 9)$$

P. T. O.

(e) Evaluate the following :

$$\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos 2x}}{\sqrt{2x}}$$

2. (a) Solve the following equations using matrix : 15

$$x + y + z = 2$$

$$6x - 4y + 5z = 31$$

$$5x + 2y + 2z = 13$$

Or

(b) A relation R on set A = {2, 4, 6, 8, 10} is defined by :

$$R = \{(2, 4), (2, 6), (2, 8), (2, 10), (4, 6), (4, 8), (4, 10), (6, 8), (6, 10), (8, 10)\}$$

Then determine that whether the relation R is :

(i) Reflexive

(ii) Transitive

(iii) Symmetric

3. (a) Evaluate determinant of the following : 15

$$\begin{vmatrix} 3 & 5 & 9 \\ 1 & 4 & 8 \\ 6 & 2 & 7 \end{vmatrix}$$

[3]

Or

(b) Find the inverse of the following matrix :

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}$$

4. (a) Discuss the continuity of the following function at $x = a$: 15

$$f(x) = (x - a)^{-1} \sin\left(\frac{1}{(x - a)}\right)$$

Or

(b) Differentiate the following function w.r.t. x :

$$f(x) = \sin^{-1}\left(\frac{2x}{(1 + x^2)}\right) + \sec^{-1}\left(\frac{(1 + x^2)}{(1 - x^2)}\right)$$

5. (a) Integrate : 15

$$\int \frac{8 - 3t}{10t^2 + 13t - 3} dt$$

Or

(b) What do you mean by conjunction and disjunction ? Explain both with their truth tables.