



**BCA I Semester (NEP) Degree Examination, March/April - 2022**  
**COMPUTER SCIENCE**  
**Mathematical Foundation**

Time : 3 Hours

Maximum Marks : 60

**SECTION - A**

Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**

1. (a) Define proposition. Give an example.
- (b) Indicate the Negation for the following statement.  
"Computer Science is a hard subject".
- (c) If  $A = \begin{bmatrix} 2 & 3 \\ 0 & -1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 4 & 5 \\ 7 & 6 \end{bmatrix}$  find  $2A+B$ .
- (d) If  $A = \begin{bmatrix} 1 & -3 & 5 \\ 6 & 2 & 4 \end{bmatrix}$  find  $5A'$ .
- (e) Find the radian measure to the degree  $240^\circ$ .
- (f) Find  $\cos x$ , if  $\sin x = \frac{3}{5}$ ,  $x$  lies in Second Quadrant.
- (g) Differentiate  $x^3 - 5x^2 + 7x + 1$  w.r.to.  $x$ .
- (h) Find  $\frac{d^2y}{dx^2}$  for the function  $y = x^2 + 3x + 2$ .
- (i) Evaluate :  $\int (2x^2 + e^x) dx$
- (j) Evaluate :  $\int_0^1 x^2 \cdot dx$



**SECTION - B**

Answer **any four** of the following questions. Each question carries **five** marks.

**4x5=20**

2. State the converse, inverse and contrapositive for the following statement.  
 “If a triangle is not Isosceles then it is not equilateral.”

3. By using properties of Determinants show that 
$$\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a).$$

4. Show that  $\sin 3x = 3\sin x + 4\sin^3 x$ .

5. Evaluate :  $\lim_{x \rightarrow 2} \frac{3x^2 - x - 10}{x^2 - 4}$ .

6. Evaluate :  $\int x \cdot \cos x \cdot dx$

7. Find the inverse of matrix  $\begin{bmatrix} 5 & 1 \\ -3 & 4 \end{bmatrix}$

**SECTION - C**

Answer **any three** of the following questions. Each question carries **ten** marks.

**3x10=30**

8. Verify the given compound proposition :  
 $[ ( p \rightarrow r ) \wedge ( q \rightarrow r ) ] \rightarrow [ ( p \vee q ) \rightarrow r ]$  is either Tautology or Contradiction.

9. Solve the following by Cramer's Rule :

$$3x + y + 5z = 10$$

$$x + y + z = 0$$

$$2x - y + 3z = 9$$



10. Prove that the function  $f(x) = 5x - 3$  is continuous at  $x=0$ ,  $x=3$  and  $x=5$ .

11. (a) Differentiate  $\sin x \cdot \cos x$  w.r.to.  $x$ .

(b) Differentiate  $\frac{x+1}{x}$  w.r.to.  $x$ .

12. Evaluate :  $\int_0^{5x^2} \int_0^x (x^2 + y^2) dx dy$

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