11/05/2022

46143

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 $240°$.

   (f) Find $\cos x$, if $\sin x = \dfrac{3}{5}$, x lies in Second Quadrant.

   (g) Differentiate $x^3 - 5x^2 + 7x + 1$ w.r.to. x.

   (h) Find $\dfrac{d^2 y}{dx^2}$ for the function $y = x^2 + 3x + 2$.

   (i) Evaluate : $\int \left(2x^2 + e^x\right) dx$

   (j) Evaluate : $\int_0^1 x^2 . dx$

SECTION - B

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

<div align="right">4x5=20</div>

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 : $\lim\limits_{x \to 2} \dfrac{3x^2 - x - 10}{x^2 - 4}$.

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

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.

<div align="right">3x10=30</div>

8. Verify the given compound proposition :

    $[(p \to r) \wedge (q \to r)] \to [(p \vee q) \to r]$ 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 continous at $x=0$, $x=3$ and $x=5$.

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

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

12. Evaluate : $\displaystyle\int_{0}^{5x^2}\int_{0}^{} x\left(x^2+y^2\right) \, dx\,dy$

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