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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF INFORMATION SCIENCE

MAKE UP EXAMINATION-JAN 2023

Course Code: MAT 2007

Course Name: Applied Mathematics

Program: BCA

Date: 20-JAN-2023

Time: 9:30AM to 12:30PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) Read all the questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculators are permitted.

Part A

Answer all the questions.

(10Qx 2M=20M)

1. The order of the matrix $A = \begin{bmatrix} 2 & 4 \\ -2 & 3 \end{bmatrix}$ is _____. (C.O.No.4) [Knowledge]
2. If $A = \begin{bmatrix} 3 & 4 \\ 7 & 8 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, then $A + B$ is _____. (C.O.No.4) [Knowledge]
3. Convert the angle measure from degrees to radians.
(a) 120° (b) 45° (C.O.No.1) [Knowledge]
4. Find the value of
(a) $\sin(90^\circ + \theta)$ (b) $\cos(180^\circ - \theta)$ (C.O.No.1) [Knowledge]
5. The value of $\sin^{-1}(-x)$ is _____. (C.O.No.1) [Knowledge]
6. Define direction cosines of a line. (C.O.No.1) [Knowledge]
7. Find the limit of $\lim_{x \rightarrow 0} x + 2$. (C.O.No.2) [Knowledge]
8. Differentiate x^2 w.r.t. x . (C.O.No.2) [Knowledge]
9. Find the value of $\int \cos x \, dx$. (C.O.No.3) [Knowledge]
10. Integrate the function $f(x) = 4x + 2$ from 0 to 2. (C.O.No.3) [Knowledge]

Part B

Answer all the questions.

(5Qx10M= 50M)

11. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$, by reducing into row echelon form.

(C.O.No.4) [Comprehension]

12. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$.

(C.O.No.4) [Comprehension]

13. Find the vector and cartesian equation of the line passing through the point (5, 2, -4) and parallel to the vector $3\hat{i} + 2\hat{j} - 8\hat{k}$.

(C.O.No.1) [Comprehension]

14. Verify the Rolle's theorem for the function $f(x) = x^2 - 6x + 5$ in (0, 6).

(C.O.No.2) [Comprehension]

15. Evaluate the following $\int (7x + 5 + 9e^x) dx$

(C.O.No.3) [Comprehension]

Part C

Answer all the questions.

(2Qx15M=30M)

16. Evaluate $\int \frac{3x+11}{(x+2)(x-3)} dx$ by using partial fraction method.

(C.O.No.3) [Application]

17. Solve the system of equation by Gauss elimination method

$$2x_1 + x_2 + 4x_3 = 12$$

$$4x_1 + 11x_2 - x_3 = 33$$

$$8x_1 - 3x_2 + 2x_3 = 20$$

(C.O.No.4) [Application]