Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF INFORMATION SCIENCE
END TERM EXAMINATION - JAN 2023

Semester : Semester I - 2022
Course Code : MAT2007
Course Name : Sem I - MAT2007 - Applied Mathematics
Program : BCA/BCG/BCV/BSc - Data Science

Date : 05-JAN-2023
Time : 09:30 AM - 12:30 PM
Max Marks : 100
Weightage : 50%

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

PART A

ANSWER ALL THE FOLLOWING QUESTIONS **10 X 2 = 20M**

1. Check the singularity of the matrix $\begin{bmatrix} 1 & 5 \\ 3 & 7 \end{bmatrix}$

(CO4) [Knowledge]

2. Find the transpose of the matrix $\begin{bmatrix} 3 & -2 & 7 \\ 5 & 3 & 2 \\ -1 & -2 & 5 \end{bmatrix}$

(CO4) [Knowledge]

3. Convert the angle measure from radians to degrees.

$(i)\frac{5\pi}{11} \quad (ii)\frac{15\pi}{8}$

(CO1) [Knowledge]

4. Find the value of the trigonometric functions

$(i)\sin 120° \quad (ii)\cos(-60°)$

(CO1) [Knowledge]

5. Find the value of $\sin^{-1}(\frac{1}{2})$.

(CO1) [Knowledge]

6. What is the sum of squares of direction cosines?

(CO1) [Knowledge]

7. Determine the continuity of the function $x+2$ at 0.

(CO2) [Knowledge]

8. What is the derivative of $\cos x$.

(CO2) [Knowledge]

9. Find the integration of $I = \int (2x + \sin x)\, dx$.

(CO3) [Knowledge]

10. Find the integration of $\frac{1}{x}$.

(CO3) [Knowledge]

PART B

ANSWER ALL THE FOLLOWING QUESTIONS **5 X 10 = 50M**

11. Find the rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$, by reducing it into row echelon form.

(CO4) [Comprehension]

12. Obtain the inverse of the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{bmatrix}$.

(CO4) [Comprehension]

13. Find the cartesian and vector equation of a line passing through point (3, -6, 1) and parallel to the vector $4\hat{i} + 2\hat{j} - 5\hat{k}$.

(CO1) [Comprehension]

14. For the function $g(x) = x^2 - 1$, verify Lagrange's mean value theorem in (1,2).

(CO3) [Comprehension]

15. Evaluate the following $\int (10x^5 + x^{-2} - a^x)\, dx$.

(CO3) [Comprehension]

PART C

ANSWER ALL THE FOLLOWING QUESTIONS **2 X 15 = 30M**

16. Integrate $I = \int \frac{3x}{(2x+1)(x+4)} dx$ by using partial fraction Method

(CO3) [Application]

17. Solve the system of equations by Gauss Elimination Method $x + y + z = 9, x - 2y + 3z = 8, 2x + y - z = 3$

(CO4) [Application]

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