GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Basic Sciences

Master of Science in Physics
Mid Term Examination - Nov 2023

Duration : 90 Minutes
Max Marks : 50

Sem I - C1PO103T - Mathematical Physics-I

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Explain the complex variable in three different forms. K2 (2)

2) Find the integral $\int_c \frac{3z^2+7z=1}{z=1}\, dz, where\ C$ is the circle $|z| = 1/2.$ K1 (3)

3) Estimate the $\int_c \frac{cos\pi z}{z-1} dz$, where c is the circle $|z| = 3.$ K2 (4)

4) Show that $A = \frac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$ is orthogonal. K2 (6)

5) Develop the A(B+C)= AB+BC, If A =$\begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$, B =$\begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$, C =$\begin{bmatrix} -3 & 1 \\ 2 & 0 \end{bmatrix}$. K3 (6)

6) Solve the simultaneous equations with the help of matrices $x + y + z = 3,\ \ x + 2y + 3z = 4,\ \ x + 4y + 9z = 6$ K3 (9)

7) A particle of mass m suspended vertically by a light inextensible string oscillating under gravity constitutes a simple pendulum. Examine the period of oscillation of simple pendulum K4 (8)

8) If a spring is fixed at O and a mass m is suspended from the lower end of the spring, then analyze the equation of motion for a spring mass system. K4 (12)

OR

Analyze that the matrix $B^{\theta}AB$ is Hermitian or skew-Hermitian according as A is Hermitian or Skew-Hermitian K4 (12)