UPES

End Semester Examination, December 2023

Course: Remedial Mathematics **Semester:** I
Program: B. Pharma **Duration:** 1.5 Hours
Course Code: BP106RMT **Max. Marks:** 35

Instructions:

1. There are two sections in this question paper, all sections are compulsory.
2. Attempt any ONE question out of the TWO in Section A (There is an internal choice for Q1).
3. Attempt any FIVE questions out of the SEVEN in section B.

SECTION A
(1Qx10M=10 Marks)

Attempt 1 out of 2

S. No.		Marks	COs
Q 1	Use adjoint method to find the inverse of the matrix $A = \begin{bmatrix} 3 & 1 & 2 \\ 2 & 1 & -2 \\ 0 & 1 & 1 \end{bmatrix}$ **OR** Solve the following system of equations. $x + y + z = 9$ $2x - y + z = 5$ $4x + y - z = 7$	10	CO1
Q 2	The total weight of ingredient presents in drug $R = 600mg$, drug $S = 300mg$ and drug $T = 400mg$. The amount of ingredients that present are given in a matrix below: $\begin{array}{c} \\ R \\ S \\ T \end{array} \begin{array}{ccc} P & Q & R \\ \begin{bmatrix} 2 & 2 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \end{bmatrix} \end{array}$ Calculate individual amount of ingredient present in each drug.	10	CO5

SECTION B
(5Qx5M=25 Marks)

Attempt 5 out of 7

Q 1	Prove that the following points are collinear $(-3,0), (0,-9), and (-2,-3)$ are collinear.	5	CO2
Q 2	Calculate the value of x in $\frac{\log 144}{\log 12} = \log x$	5	CO1
Q 3	Evaluate the integral $\int \frac{x+4}{3+2x-x^2} \, dx$	5	CO2

Q 4	Determine the equation of a straight line passing through the point $(3, -4)$ and $(1, -3)$.	5	CO2
Q 5	Differentiate $(x^2 + 7x + 2)(e^x - sinx)$ with respect to x.	5	CO3
Q 6	Discuss the applications of Partial fractions, Matrices, Differential equations, log functions and Laplace transformation in Pharmacokinetics.	5	CO4
Q 7	Define differential equation. Find the order and degree of the following differential equations: 1. $\frac{d^2y}{dx^2} + 5x\frac{dy}{dx} - 9 = 0$ 2. $\left(\frac{d^3y}{dx^3}\right)^2 + y = 0$ 3. $\left(\frac{d^2y}{dx^2}\right)^4 + 2\left(\frac{dy}{dx}\right)^2 + x = 0$ 4. $\frac{d^4y}{dx^4} + \left(\frac{d^2y}{dx^2}\right)^2 + \frac{dy}{dx} - y = 6$	5	CO3