Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examinations, Dec 2021-Jan 2022

Course: Remedial Mathematics **Semester:** I
Program: B.Pharma **Time:** 90 min
Course Code: BP106RMT **Max. Marks:** 35

SECTION - A **1 x 10 = 10 Marks**

Answer any ONE question.

Q 1	Define the Inverse of a matrix and find A^{-1} if $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$.	CO1
Q 2	Resolve $\frac{3x^2+2x-2}{(x-1)^2(2x-1)}$ as the sum of its partial fractions.	CO1

SECTION – B **5 x 5 = 25 Marks**

Answer any FIVE questions. Each question will carry 5 marks

Q 3	Differentiate $(\sin x)^x + x^{\sin x}$ with respect to 'x'.	CO4
Q 4	Evaluate $\int \frac{2x+1}{x^2-3x+2}\, dx$ using integration by partial fractions technique.	CO2
Q 5	Evaluate the following limits: (i) $\lim_{z\to 8} \frac{2z^2-17z+8}{8-z}$ (ii) $\lim_{x\to 0} \frac{x}{3-\sqrt{x+9}}$	CO3
Q 6	Find the stationary points and maxima and minima of the function $f(x) = x^3 - 6x^2 + 9x + 10$.	CO3
Q 7	Define Laplace transform and evaluate the following (i) $L[e^{4t}(\cos 3t + 2sin3t)]$ (ii) $L^{-1}\left[\frac{2s-1}{(s^2-2s+10)}\right]$	CO3
Q 8	Check the exactness and solve the differential equation $(x^2 + 2\sin y)dx + (2x\cos y + y)dy = 0$	CO4
Q 9	The total weight of ingredient present in drug $P = 500mg$, drug $Q = 300mg$ and drug $R = 400mg$. The amount of ingredient that present are given in a matrix shown below. Calculate the individual amount of ingredient present in each drug. $\begin{matrix} \\ P \\ Q \\ R \end{matrix} \begin{matrix} A & B & C \\ \end{matrix} \begin{bmatrix} 2 & 2 & 1 \\ 1 & 1 & 1 \\ 2 & 1 & 1 \end{bmatrix}$	CO5