COEP Technological University

A Unitary Public University of Government of Maharashtra

	(MA-20001)	Ordinary	Differential	Equations	and	Multivariate	Calculus
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Program : S.Y.B.Tech. Sem. I

Academic Year: 2023-24

Examination: Re-Test 1

Maximum Marks: 20

Date: 4/11/2023

Time: 8 am - 9 am

Branch:

Student MIS Number:

Name and Signature of the Invigilator: _

Q.1	Q.2	Q.3	Q.4	Total	Signature

Attempt All the Questions.

Question [I](5 marks)

- (1) A solution that can be obtained from general solution is called a solution. [CO1][1]
- (2) Write the order and degree of the differential equation $y = \sqrt{(y')^3 + y''}$. Order = Degree =

[CO1][1]

(3) Find the linear differential equation whose linearly independent solutions are 1, e^x , xe^x . [CO3][3] Detailed Answer:

Question [II](5 marks)

(1) Show that the family of curves $\frac{x^2}{c^2} + \frac{y^2}{c^2 - 1} = 1$ is self-orthogonal. Detailed Answer:

[CO2][2]

(2) Reduce the differential equation
$$y'' + (1 + \frac{1}{y})(y')^2 = 0$$
 to first order and solve. Detailed Answer:

[CO2][2]

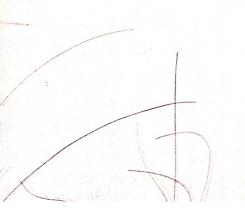
(3) Fill in the blank. The general solution of y'' + 2y' + y = 0 is

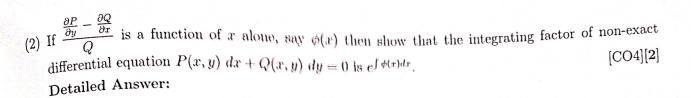
[CO2][1]

Question [III](5 marks)

(1) Solve
$$\cos^2 x \frac{dy}{dx} + 3y = 1$$
, $y\left(\frac{\pi}{4}\right) = \frac{4}{3}$. Detailed Answer:

[CO3][**3**]





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Question [IV](5 marks)

(1) Solve $(D^4 - 3D^2 - 4)y = 0$.

Detailed Answer:

[CO3][2]

(2)	Determine the current $i(t)$ in a series circuit with two 9-volt batteries, $\frac{1}{4}$ henry inductance, and 8 ohms of resistance, assuming the initial current is zero. Further find steady rate current. [CO5][3] Detailed Answer:

ROUGH WORK (Will Not Be Assessed)