Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– I & II (SPFU) EXAMINATION – WINTER 2019

Subject Code: MTH002 **Date: 07/01/2020**

Subject Name: Ordinary Differential Equation

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Check whether the given differential equation is exact or not $(x^4-2xy^2+y^4)dx-(2x^2y-4xy^3+\sin y)dy=0$ .Hence find the general solution.	**03**
	(b)	Find the orthogonal trajectories of the family of semi cubical parabolas $ay^2 = x^3$	**04**
	(c)	Solve $y''-3y'+2y = e^x$ by using variation of Parameter method	**07**
Q.2	**(a)**	Find the Wronskian of y_1, y_2 of $y''-2y'+y=e^x \log x$	**03**
	(b)	Solve $\frac{dy}{dx}+y\sin x=e^{\cos x}$	**04**
	(c)	Using Method of undetermined Coefficient solve $y'+4y = 8x^2$	**07**
Q.3	**(a)**	Find the orthogonal trajectories of cardioid $r = a(1 - \cos\theta)$	**07**
	(b)	Find the Series solution of $y'-2xy=0$	**07**
Q.4	**(a)**	Solve $x^2y''-xy'+y=x$	**07**
	(b)	Discuss about Singular point and classify singular pints for the differential equation $x^3(x-1)y''+3(x-1)y'+7xy=0$	**07**
Q.5	**(a)**	Solve in Series the differential equation $4x\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=0$	**07**
	(b)	The population of a country increases at the proportional to the current population. if the population doubles in 40 years, in how many years will it triple itself.	**07**
Q.6	**(a)**	Solve $(x^2y^2+2)ydx+(2-x^2y^2)xdy=0$	**07**
	(b)	Solve $(D^2-1)y=xe^x$ where $D=\frac{d}{dx}$	**07**
Q.7	**(a)**	Solve the initial value Problem $y''-9y=0, y(0)=2, y'(0)=-1$	**07**
	(b)	If $y_1 = x$ is one solution of $x^2y''+xy'-y=0$ .Find the second solution	**07**

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