RAMAIAH
Institute of Technology

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DEPARTMENT OF MATHEMATICS

Sub Code:	MA21	**Sub:**	Engineering Mathematics-II	**Test:**	I
Time:	2.00 to 3.00 pm	**Term:**	May to August 2021	**Marks:**	30
Date:	28-06-2021	**Semester:**	I	**Sections:**	A-R

Note: Answer any TWO full questions. Each main question carries 15 marks.

Q.No.		Questions	Blooms Level	CO's	Marks
1.	(a)	Find $\frac{ds}{dy}$ for $a^2y^2 = a^3 - x^3$ at $(a, 0)$.	L1	CO1	2
	(b)	Using Maclaurin's series expand $\sqrt{1 + \sin x}$ up to the term containing x^2.	L2	CO1	3
	(c)	A rectangular box open at the top is to have volume of 108 cubic ft. Find the dimension of the box if its total surface area is minimum.	L4	CO1	5
	(d)	Obtain the expression for radius of curvature in polar form.	L3	CO1	5
2.	(a)	Write the DE of the closed circuit involving L, C and R in series with applied e.m.f.	L1	CO2	2
	(b)	Find the Orthogonal trajectories of the family of $x^{2/3} + y^{2/3} = a^{2/3}$.	L2	CO2	3
	(c)	Solve $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 8e^{3x}\sin 2x$.	L3	CO2	5
	(d)	A body is originally at 80^0C and cools down to 60^0C in 20 minutes. If the temperature of the air is 40^0C, find the temperature of the body after 40 minutes.	L4	CO2	5
3.	(a)	Write Taylor's series for functions of two variables.	L1	CO1	2
	(b)	Examine $x^3 + y^3 - 3axy$ for extreme values.	L2	CO1	3
	(c)	Show that the family of parabolas $y^2 = 4a(x + a)$ is self-orthogonal. Where a is the parameter.	L4	CO2	5
	(d)	Solve $(D^2 + 1)y = \sin x \sin 2x$.	L3	CO2	5