Course Code: 1920002 Roll No: **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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I B.Tech II Sem Supply Examination, March 2021

MATHEMATICS-II

(CIVIL, EEE, MECH, ECE, CSE & IT)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Answer any FIVE questions.
2. Each question carries 14 marks and may have a, b as sub questions.

1	a)	Solve the differential equation $\frac{dy}{dx}+\frac{2}{x}y=x^2y^2$.	7M	CO1	R
	b)	Solve: $(x^2-ay)dx=(ax-y^2)dy$.	7M	CO1	U
2	a)	A body originally at 80^oC cools down to 60^oC in 20 minutes, the temperature of the air being 40^oC. What will be the temperature of the body after 40 minutes from the original?	7M	CO1	Ap
	b)	Solve: $(y-px)(p-1)=p$	7M	CO1	U
3	a)	Solve: $\frac{d^2y}{dx^2}+4\frac{dy}{dx}+3y=e^{2x}$	7M	CO2	U
	b)	Solve: $(D^2+1)y=Tanx$	7M	CO2	Ap
4	a)	By changing the order of integration, evaluate $\int_0^1\int_{e^x}^{e}\frac{dydx}{\log y}$.	7M	CO3	U
	b)	Using double integration, Find the area lying between the parabola $y=4x-x^2$ and the straight line $y=x$.	7M	CO3	AP
5	a)	Solve: $x^2\frac{d^2y}{dx^2}-4x\frac{dy}{dx}+6y=x$	7M	CO2	U
	b)	Find the volume bounded by the coordinate planes, and the plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$.	7M	CO3	Ap
6	a)	Find the directional derivative of $\phi=xy+yz+zx$ at (1,1,1) in the direction towards the point (2,-1,3).	7M	CO4	Ap
	b)	Show that *Curl grad* $\phi=0$ where ϕ is a scalar point function.	7M	CO4	U

7	a)	A fluid motion is given by $\overline{f} = (y+z)i + (x+z)j + (y+x)k$. Is this motion irrotational? If so find the scalar potential.	7M	CO4	Ap
	b)	Prove that the area bounded by the closed curve C is $\frac{1}{2}\oint xdy - ydx$.	7M	CO5	U
8	a)	Find the work done in moving a particle in the force field $\bar{F} = 3xyi - 5zj + 10xk$ along the curve $x = t^2 + 1, y = 2t^2, z = t^3$ from $t = 1$ to $t = 2$.	7M	CO5	Ap
	b)	Evaluate $\int_S \bar{F}\,\hat{n}\,ds$ where $\overline{F} = yzi + xzj + xyk$ and S is the portion of the sphere $x^2 + y^2 + z^2 = 1$ which is in the first octant.	7M	CO5	R

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