	MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE DEPARTMENT OF MATHEMATICS I - Internal Assessment I - Semester.	Sub. Name: Mathematics-I for Computer Science and Engineering Stream Sub Code: BMATS101 Date: 09/11/2023 Total Marks: 30 Faculty: Dr. AHS/ Dr. SP/ Dr. RSI/ SS/ Dr.ACK/ KN/ BK / BV/ TNG / ND / SR
NOTE:-Answer any TWO full questions, choosing at least ONE from each PART		

wQ.No		PART-A	M	BTL	COs
1	a	Derive an Expression for the radius of curvature in the case of Polar curve.	7	L2	1
	b	Show that the curves $r^n = a(1+\cos n\theta)$ *and* $r^n = b(1-\cos n\theta)$ cuts each other orthogonally.	8	L2	1
		OR			
2	a	Find the radius of curvature for the curve $x = asin2\theta(1+cos2\theta)$, $y = acos2\theta(1-cos2\theta)$.	7	L3	1
	b	Find the pedal equation for the curve $r = \frac{ae^{\theta}}{(1-\theta)^2}$	8	L3	1
		PART-B			
3	a	Expand $log(1+sinx)$ by Maclaurin's Series upto the term containing x^4 .	7	L3	1
	b	Evaluate (a) $\lim_{x\to 0} x^x$, (b) $\lim_{x\to 0}(cosx)^{\frac{1}{x^2}}$.	8	L3	1
		OR			
4	a	Expand $e^{\sin x}$ by Maclaurin's Series upto the term containing x^4	7	L3	1
	b	Evaluate (a) $\lim_{x\to 0}\left[\frac{\sin x}{x}\right]^{\frac{1}{x^2}}$, (b) $\lim_{x\to 0}(cotx)^{tanx}$	8	L3	1

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	MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE DEPARTMENT OF MATHEMATICS II- Internal Assessment I-Semester.	Sub. Name:Mathematics-I for Computer Science and Engineering stream Sub Code:BMATS101 Date:07/12/2023 Total Marks: 30 Faculty:Dr.AHS/SS/Dr.ACK/KN/BK//TNG/BV/ND/SR

Instructions to students

Note : Answer any TWO full questions, choosing al least ONE from each part.

Q.No		PART-A	M	BTL	COs
1	a	If $u = f\left(\frac{x}{y}, \frac{y}{z}, \frac{z}{x}\right)$ then P.T $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} = 0$	7	L2	CO1
	b	Examine the function $f(x,y)=2(x^2-y^2)-x^4+y^4$ for its extreme value.	8	L3	CO1
		OR			
2	a	If $x+y+z = u$, $y+z = uv$ and $z = uvw$ then find $J\left(\frac{x,y,z}{u,v,w}\right)$.	7	L2	CO1
	b	If $u = e^{(ax+by)} f(ax - by)$ then P.T $b\frac{\partial u}{\partial x} + a\frac{\partial u}{\partial y} = 2abu$	8	L2	CO1
		PART-B			
3	a	Solve the following system by Gauss – Seidel method $x + y + 54z = 110, 27x + 6y - z = 85, 6x + 15y + 2z = 72.$	7	L3	CO4
	b	Find the rank of the matrix $A=\begin{bmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{bmatrix}$	8	L2	CO4
		OR			
4	a	For what value of λ and μ the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ has a)No solution b) unique solution and c) infinite number of solution	7	L2	CO4
	b	Find the largest Eigen value and the corresponding Eigen Vector of the matrix A by using Rayleigh's power method. Take $[1,0,0]^T$ as the initial Eigen vector $A=\begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$	8	L2	CO4

	MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE **DEPARTMENT OF MATHEMATICS** **III- Internal Assessment** **I- Semester.**	**Sub. Name: Mathematics-I for Computer Science and Engineering stream** **Sub Code:BMATS101** **Date:08/01/2024** **Total Marks: 30** **Faculty:Dr.AHS/SS/Dr.ACK/KN/BK//TNG/BV/ND/SR**
Instructions: Answer any TWO full questions, choosing at least ONE from each part.		

Q.No		PART-A	M	BTL	COs
1	a	Solve: $x\frac{dy}{dx} + y = x^3y^6$	7	L3	2
	b	Solve: $p^3 + 2xp^2 - y^2p^2 - 2xy^2p = 0$	8	L3	2
		OR			
2	a	Solve: $(3x^2y^4 + 2xy)dx + (2x^3y^3 - x^2)\,dy = 0$	7	L3	2
	b	Prove that the system of parabolas $y^2 = 4a(x + a)$ is self orthogonal.	8	L3	2

		PART-B			
3	a	Find the solution of system of linear congruence $7x + 3y \equiv 10(mod16)$ $2x + 5y \equiv 9(mod16)$	7	L2	3
	b	Find the general solution of linear Diophantine equation $70x + 112y = 168$	8	L2	3
		OR			
4	a	Using Fermat's little theorem, Find the remainder when 11^{104} is divided by 7	7	L2	3
	b	(i) Find the remainder when 2^{23} is divided by 47 (ii) Find the remainder when 146! is divided by 149	8	L2	3