

**CONTINUOUS INTERNAL EVALUATION - 3**

Dept:BS	Sem /Div: 1/A,B,C,D,E&F	Sub:Calculus and Linear Algebra	S Code:18MAT11
Date:16-12-2019	Time: 9:30-11:00	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks	RBT	CO's
<b>PART A</b>				
1 a	If the temperature of the air is 30 <sup>0</sup> C and a metal ball cools from 100 <sup>0</sup> C to 70 <sup>0</sup> C in 15 minutes, find how long will it take for the metal ball to reach a temperature of 40 <sup>0</sup> C	8	L3	CO4
b	Find the orthogonal trajectories of $r^n \cos n\theta = a^n$ where 'a' is the parameter	8	L3	CO4
c	Solve: $xy\left(\frac{dy}{dx}\right)^2 - (x^2 + y^2)\frac{dy}{dx} + xy = 0$	9	L2	CO4
<b>OR</b>				
2 a	Find the general and singular solution of $(px-y)(py+x)=2p$ by using the substitution $u=x^2, v=y^2$	8	L1	CO4
b	Show that the family of parabolas $y^2=4a(x+a)$ is self orthogonal	8	L3	CO4
c	Solve: $p^2+2p\cot x=y^2$	9	L2	CO4

**PART B**

3	a	Solve the following system of equations by Gauss-Seidel Method $10x+y+z=12, x+10y+z=12, x+y+10z=12$ . Carry out 4 iterations	8	L2	CO
	b	Find the rank of $A = \begin{bmatrix} 1 & 3 & -1 & 2 \\ 0 & 11 & -5 & 3 \\ 2 & -5 & 3 & 1 \\ 4 & 1 & 1 & 5 \end{bmatrix}$	8	L1	CO
	c	Solve by Gauss-Jordan method $x+y+z=9, x-2y+3z=8, 2x+y-z=3$	9	L2	CO

**OR**

4	a	Investigate the values of $\lambda, \mu$ such that $x+2y+3z=6, x+3y+5z=9, 2x+5y+\lambda z=\mu$ may have (i)no solution (ii)unique solution (iii)infinite solution	8	L2	CO
	b	Find numerically largest eigen value and the corresponding eigen vector of the matrix $A = \begin{bmatrix} 4 & 1 & -1 \\ 2 & 3 & -1 \\ -2 & 1 & 5 \end{bmatrix}$ by Power method . Take $X_0 = [1, 0.8, -0.8]^t$ perform 5 iterations	8	L2	CO
	c	Reduce the matrix $A = \begin{bmatrix} -19 & 7 \\ -42 & 16 \end{bmatrix}$ into the diagonal form	9	L2	CO

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