

CRM08

Rev 1.9

<BS>

<21/10/19>

CONTINUOUS INTERNAL EVALUATION - 1

Dept:BS	Sem/Div: I / A,B,C,D,E,F	Sub:Calculus and Linear Algebra	S Code: 18MAT11
Date: 24/10/19	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
PART A				
1 a	Show that the angle between the curves $r = a \log \theta$ and $r = \frac{a}{\log \theta}$ is $2 \tan^{-1} e$	8	L1	CO1
b	With usual notation, prove that $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4} \left(\frac{dr}{d\theta} \right)^2$	8	L2	CO1
c	Find the radius of curvature for the curve $y^2 = \frac{a^2(a-x)}{x}$ at the point where the curve meets the x-axis.	9	L2	CO1
OR				
2 a	Find the pedal equation of the curve $r^m = a^m (\cos m\theta + \sin m\theta)$	8	L2	CO1
b	Show that the tangent to the cardioid $r = a(1 - \cos \theta)$ at the points $\theta = \frac{\pi}{3}$ and $\theta = \frac{2\pi}{3}$ are respectively parallel and perpendicular to the initial line.	8	L1	CO1
c	Find the coordinates of the centre of curvature at any point of the parabola $y^2 = 4ax$. Hence show that its evolute is $27ay^2 = 4(x - 2a)^3$	9	L2	CO1

PART B

3	a	Expand the function $\log(\sec x + \tan x)$ by using Maclaurin series upto terms containing 5 th degree.	8	L2	CO2
	b	Evaluate $\lim_{x \rightarrow 0} \left(\frac{\tan x}{x} \right)^{1/x^2}$	8	L2	CO2
	c	Find the volume of the greatest rectangular parallelopiped that can be inscribed in the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$	9	L2	CO2

OR

4	a	If $u=yz/x, v=zx/y, w=xy/z$ find the Jacobian of u,v,w w.r.t x,y,z .	8	L2	CO2
	b	If $u=f\left(\frac{y-x}{xy}, \frac{z-x}{xz}\right)$ then prove that $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} + z^2 \frac{\partial u}{\partial z} = 0$	8	L2	CO2
	c	Examine the fncion $f(x,y)=2(x^2-y^2)-x^4+y^4$ for its extermes values.	9	L2	CO2

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21/10/19

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