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Vivekananda College of Engineering & Technology, Puttur
 [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®]
 Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08	Rev 1.10	BS	25-02-2021
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CONTINUOUS INTERNAL EVALUATION - 2

Dept:BS	Sem / Div:1/A,B,C,D,E,F	Sub:Calculus and Linear Algebra	S Code:18MAT11
Date:04-03-21	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 Find the pedal equation of (i) $r^m \cos m\theta = a^m$ (ii) $r = 2(1 + \cos\theta)$	8	L2	CO1
	b Find the radius of curvature at the point $(\frac{3a}{2}, \frac{3a}{2})$ on the curve $x^3 + y^3 = 3axy$	8	L2	CO1
	c Show that the evolute of the parabola $y^2 = 4ax$ is $27ay^2 = 4(x - 2a)^3$	9	L2	CO1
OR				
2	a With usual notations prove that $\frac{1}{p^2} = \frac{1}{r^2} + \frac{1}{r^4} \left[\frac{dr}{d\theta} \right]^2$	8	L2	CO1
	b Find the radius of curvature of $r^n = a^n \cos n\theta$	8	L2	CO1
	c Show that the pedal equation of the curve $r^n = a^n \sin n\theta + b^n \cos n\theta$ is $p^2(a^{2n} + b^{2n}) = r^{2n+2}$	9	L2	CO1
PART B				

3	a	Evaluate $\int_{-c}^c \int_{-b}^b \int_{-a}^a (x^2 + y^2 + z^2) dz dy dx$	8	L2	CO3
	b	Derive the relation between Gamma and Beta function	8	L2	CO3
	c	Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by double integration	9	L2	CO3
OR					
4	a	Change the order of integration and hence evaluate $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y} dy dx$	8	L2	CO3
	b	Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dx dy$ by changing into polar coordinates	8	L2	CO3
	c	Show that $\int_0^{\frac{\pi}{2}} \frac{1}{\sqrt{\sin \theta}} d\theta * \int_0^{\frac{\pi}{2}} \sqrt{\sin \theta} d\theta = \pi$	9	L2	CO3

Ravi
25/2/21

Prepared by: Ravishankar N K

M. Ramesh Kamath
27/2/2021

HOD: M. Ramesh Kamath