

CONTINUOUS INTERNAL EVALUATION - 3

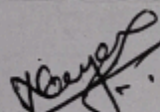
Dept: BS	Sem / Div: III/A,B	Sub: ADDITIONAL MATHEMATICS I	S Code: 18MATDIP31
Date: 21/03/2022 2	Time: 3:50-5:00 pm	Max Marks: 50	Elective: N

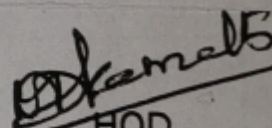
Note: Answer any 2 full questions, choosing one full question from each part.

QN	Questions	Marks
PART A		
1	a A particle moves along the curve $x=1-t^3, y=1+t^2$ and $z=2t-5$ determine its velocity and acceleration.	8
	b Find the angle between the tangents to the curves $\vec{r}=t^2\mathbf{i}+2t\mathbf{j}-t^3\mathbf{k}$ at the points ± 1	8
	c If $x=t^2+1, y=4t+3, z=2t^2-6t$ Determine unit tangent vector any point.	9
OR		
2	a If $\Phi(x, y, z)=x^3+y^3+z^3-3xyz$, find $\nabla\Phi$ at $(1, -1, 2)$	8
	b Find the unit tangent vector at any point t on the curve $\vec{r}=3\cos t\mathbf{i}+3\sin t\mathbf{j}+4t\mathbf{k}$	8
	c Find the angle between the surfaces $x^2+y^2+z^2=9$, $x^2+y^2-z^2=3$ at $(2, -1, 2)$	9
PART B		
3	a With the usual notation, deduce the reduction formula for	8

	$\int_0^{\frac{\pi}{2}} \sin^n \theta d\theta$	
b	Find the directional derivative of $\Phi = x^3 y^3 z^3$ at $(1,2,1)$ along $i+2j+2k$	8
c	Find $\text{div } \vec{F}$ and $\text{curl } \vec{F}$ where $\vec{F} = \nabla(x^3 + y^3 + z^3 - 3xyz)$	9
OR		
4 a	With the usual notation, deduce the reduction formula for $\int_0^{\frac{\pi}{2}} \cos^n \theta d\theta$	8
b	Find the directional derivative of $\Phi = 4xz^3 - 3x^2y^2z$ at $(2,-1,2)$ along $2i-3j+6k$	8
c	Find the constants a, b, c such that the vector field $(\sin y + az)i + (bx \cos y + z)j + (x + cy)k$ is irrotational.	9

Prepared by:


Nayana P


HOD