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SRM UNIVERSITY
DEPARTMENT OF MATHEMATICS
CYCLE TEST II

SUB: ADVANCED CALCULUS AND COMPLEX ANALYSIS
SUB CODE: 15MA102

DURATION: 50 MINS
MAX MARKS: 25

ANSWER ALL THE QUESTIONS

PART-A(3x4=12)

1. Find the directional derivative of $\phi = xy + yz + xz$ at $(1,2,0)$ in the direction of the vector $\vec{i} + 2\vec{j} + 2\vec{k}$.
2. If $\vec{F} = 3xy\vec{i} - y^3\vec{j}$, evaluate $\int_C \vec{F} \cdot d\vec{r}$ over the curve $y = 2x^2$ in the xy plane from $(0,0)$ to $(1,2)$
3. Find $L\left[\frac{1-e^t}{t}\right]$.

PART-B(8+5=13)

4. (i) Find the constants a, b, c so that $\vec{F} = (x + 2y + az)\vec{i} + (bx - 3y - z)\vec{j} + (4x + cy + 2z)\vec{k}$ may be irrotational. For those values of a, b, c find its scalar potential.

(ii) Find $L[f(t)]$, $f(t) = \begin{cases} t, & 0 < t < \pi \\ 0, & \pi < t < 2\pi \end{cases}$ and that $f(t + 2\pi) = f(t)$.