SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(DS) - END SEMESTER EXAMINATIONS APRIL-2023
SEMESTER - II
22UDSAT2002 - Allied Mathematics - II

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Derive the formula for $\int sin^n\ xdx$
2. Evaluate $\int x^3$ cosxdx
3. Solve (D^2 - 2D + 1)y = $5e^{3x}$ + cosh2x
4. Solve xypq = z^2
5. Evaluate L(t^2 cosat)
6. Evaluate $L^{-1}\left[\frac{5s+3}{(s-1)(s^2+2s+5)}\right]$
7. If $\bar{F} = x^2y\bar{i} + y^2z\bar{j} + z^2x\bar{k}$ then find curl curl $\bar{F}$.
8. If $\bar{A} = x^3\bar{i} + y^3\bar{j} + z^3\bar{k}$ and S is the surface of the sphere $x^2 + y^2 + z^2 = a^2$, then show that $\iint_s \bar{A}.d\bar{S} = \frac{12}{5}\ \pi a^5$.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Obtain the Fourier series for the function
$$f(x) = \begin{cases} x, & 0 \le x \le \pi \\ 2\pi - x, & \pi \le x \le 2\pi \end{cases}$$
10. Determine the integral surface of x(y^2 + z)p - y(x^2 + z)q = (x^2 - y^2)z
11. Using Laplace transform solve d^2y/dt^2 + 6 dy/dt +5y = $e-2t$ given that y=0, dy/dt = 1 when t=0.
12. Verify Green's theorem for $\int_c (3x^2-8y^2)$ dx + (4y-6xy)dy where c is the boundary of the region enclosed by the parabolas x^2 = y and y^2 = x.
13. Verify Gauss Divergence Theorem for $f = x^2\bar{i} + y^2\bar{j} + z^2\bar{k}$ taken over the cube bounded by the planes $x = 0$, $x = 1$, $y = 0$, $y = 1$, $z = 0$ and $z = 1$.

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