20UPHAT4004

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.(Physics) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - IV
20UPHAT4004 - Allied Mathematics - II

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

Section B

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

1. Compute the Fourier series of periodicity 2π for f(x) = x^2 in -π < x < π.
2. Form the partial differential equation by eliminating the arbitrary constants from z = (x^2 + a) (y^2 + b).
3. Solve: $\sqrt{p} + \sqrt{q} = 1$.
4. Evaluate L[Cos^2t]
5. Evaluate L[$t^2+\sqrt{t}+e^{-3t}$]
6. Evaluate $L^{-1}\left[\frac{5}{s^2-25} + \frac{4s}{s^2+25}\right]$
7. Determine the directional derivative of $\varphi = x^2yz + 4xz^2$ at the point P(1,-2,-1) in the direction of PQ where Q is (3,-3,-2)
8. If $\vec{F}= 3(x^2 - yz)\bar{i} + 3(y^2 - xz)\bar{i} + 3(z^2 - yx)\bar{i}$ determine Div $\vec{F}$ and Curl $\vec{F}$ at the point(1,2,3)

Section C

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

9. Compute the Fourier series of periodicity 2π for $f(x) = \begin{cases} x & in(0,\pi) \\ 2\pi - x & in(\pi, 2\pi) \end{cases}$
10. Solve:(mz-ny)p + (nx – lz)q = (ly-mx)
11. Evaluate (i) L[(1-Cosat)/t] (ii) L[$tCos^2 3t$]
12. Using Partial fraction determine the Inverse Laplace transform of s/(s+2)(s+3)
13. Verify Green's theorem in a plane with respect to $\int_C [(x^2 - y^2)dx + 2xydy]$ where C is the boundary of the region in the xoy plane bounded by the lines x = 0, x = a, y = 0 and y = b.

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