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. END SEMESTER EXAMINATIONS APRIL-2022
SEMESTER - IV
20UPHAT4004 - ALLIED MATHEMATICS II

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Obtain the Fourier's Series for the function f(x) $=\frac{\pi - x}{2}$ in (0, 2π).
2. Find (i) L [$\sin$(2t +3)] and (ii) L [$\sqrt{t}$].
3. Find (i) $L^{-1}\left[\frac{s}{(s+2)^2}\right]$ (ii) $L^{-1}\left[\frac{1}{(s+1)^4}\right]$.
4. Find the directional derivative of ϕ= 4xz^2 + x^2yzat (2, –1, 2) in the direction $2\overrightarrow{i}$ +3$\overrightarrow{j}$ + 4$\overrightarrow{k}$.
5. Eliminating a and b from log(az – 1) = x + ay + b.
6. If L $[f(t)]$ = F(s) then prove that L $[f(at)]$ =$\frac{1}{a}$F$\left(\frac{s}{a}\right)$.
7. Find $L^{-1}\left[\frac{s+2}{(s^2+4_s+5)^2}\right]$.
8. Find the work done in the moving a particle in a force field $\overrightarrow{F}$=3xy$\overrightarrow{i}$ +(x + y)$\overrightarrow{j}$ – z$\overrightarrow{k}$ along the curve x = t + 1, y = t – 1, z = $t^2$from (2, 0, 1) to (4, 2, 9).

Section B

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

9. Expand f (x) = | $\sin x$ | in a Fourier series in $-\pi < x < \pi$. and Find the values of $\frac{1}{3} + \frac{1}{15} + \frac{1}{35} + \frac{1}{63}$+.....
10. Solve : (mz – ny) p – (nx – lz) q = ly – mx.
11. Find (i) L [t^2 $\sin$at], (ii) L [at^2 + bt + c].
12. Find $L^{-1}\left[\frac{4s+3}{s(s+1)(11_s+6)}\right]$.
13. Verify Green's theorem for $\int_c\left[(x^2+y^2)dx - 4xydy\right]$in the rectangular region in the xy - plane bounded by the lines x = 0, x = a, y = 0, y = b.

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