B.Sc. DEGREE EXAMINATION,APRIL 2020
I Year II Semester
Allied Mathematics-II

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Find the value of the Fourier constant a_n when odd function f(x) is expanded in (-π, π).
2. Find b_n in the expansion of x^2 as a Fourier series in (-π, π).
3. Define the order of a PDE.
4. What is a complete Integral?
5. Define Laplace transform.
6. Evaluate Laplace transform of [$t^{3/2}$ + cost +1].
7. Find Inverse Laplace transform of$^{-1}[\frac{1}{s+a}]$.
8. State the linear and shifting properties of inverse laplace transform.
9. Find ϕ = xyzfind grad ϕ at (1,1,1).
10. State Green's theorem for plane.
11. If $\overline{r}$ is the position vector , then prove that ∇ . $\overline{r} = 3$
12. What is Laplace transform ($\cos^2 t$) ?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Find the Fourier series to represent the function x -π in the interval (-π, π).
14. Form the partial differential equation by eliminating the arbitrary constant a and b from

    z = (x^2+a)(x^2+b).
15. Find Laplace transform of [cosht.sin2t].
16. Evaluate Inverse Laplace transform of $[\frac{s}{(s+2)^2}]$.
17. Find the angle of intersection at (2,-1,2) between $x^2+y^2+z^2$ =9 and z= x^2+y^2-3
18. Evaluate $\iint_s \underset{F}{\rightarrow}.\underset{n}{\rightarrow} \; ds$ where $\overline{F} = z\bar{i} + xj + y^2z\bar{k}$ and S is the surface of the cylinder x^2+y^2=1 included in the first octant between the planes z=0 and z=2.

19. Find the value of a,b,c so that the vector
$\overline{F}$ = (x+2y+az)$\bar{i}$ + (bx-3y-z)j+ (4x+cy+2z)$\overline{k}$ is irrotational

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Obtain the Fourier series for f(x)= $|x|$, $\pi \leq x \leq \pi$ and deduce $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \cdots = \frac{\pi^2}{8}$

21. Find the general solution of x(z^2-y^2)+y(x^2-z^2)=z(y^2-x^2).

22. Find the following:
(i) Laplace transform of (te^{-t}sint) (ii) Laplace transform of (sin3t cost) (iii) Laplace transform of (e^{-3t} cos^{3}3t)

23. Obtain the inverse laplace transform of $[\frac{1-s}{(s+1)(s^2+4s+13)}]$

24. Given the vector field $\overline{F}$ = xz$\bar{i}$ + x$yz$$j$+ $z^2\overline{k}$, evaluate $\int_C \underset{F}{\rightarrow}. \underset{dr}{\longrightarrow}$ from the point (0,0,0) to (1,1,1) where C is the curve (i) x=t, y=t^2 , z=t^3, (ii) The straight path from (0,0,0) to (1,1,1).

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