B.Sc DEGREE EXAMINATION,APRIL 2019
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. State Dirichlet's conditions.
2. Find a_n for the Fourier series of the function $f(x) = x$ in $-\pi < x < \pi$.
3. Form the Partial differential equation by eliminating the arbitrary constants a and b from the equation $z = \left(x^2 - a\right)(y^2 - b)$.
4. Solve : $\sqrt{p+}\sqrt{q} = 1$.
5. State and prove Linearity property of Laplace Transform.
6. Find $L[\sin at\ ]$
7. Find $L^{-1}\left[\dfrac{1}{(s-3)^4}\right]$.
8. Find the inverse laplace transform of $L^{-1}\left[\dfrac{1}{(s+4)^2+9}\right]$
9. Prove that $\nabla.\overrightarrow{r} = 3$ if $\vec{r} = x\vec{i} + y\vec{j} + c\vec{k}$.
10. Find grad φ if $\varphi = xyz$ at the point $(1, 1, -1)$.
11. State Green's theorem.
12. Solve : $px + qy = z$.

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

Answer any **FIVE** questions

13. Find the Fourier series for the function $f(x) = x^2\ , -\pi < x < \pi$.
14. Form the Partial differential equation by eliminating the arbitrary function from $z = f(x+y) + g(x-y)$.
15. Find $L\ [\ t^2\ sinat\ ]$.
16. Find $L^{-1}\left[\dfrac{s^2}{(s-4)^4}\right]$.
17. Find the directional derivative of the function $xy + yz + zx$ at $(1, 1, 3)$ in the direction of the vector $\overrightarrow{i} + 2\overrightarrow{j} + 2\overrightarrow{k}$.

18. If $\vec{F} = 3xy\,\vec{i} - y^3\,\vec{j}$, Compute $\int_C \vec{F} \cdot d\vec{r}$ along $y = 2x^2$ from $(0, 0)$ to $(1, 2)$.

19. Solve : $z = p^2 + q^2$.

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

Answer any **THREE** questions

20. Obtain a Fourier series for the function $f(x) = \dfrac{\pi - x}{2}$ $, 0 < x < 2\pi$.

21. Solve : $(mz - ny)\,p + (nx - lz)\,q = (ly - mx)$.

22. (i) Find $L\left[\dfrac{e^{at} - \cos bt}{t}\right]$.

    (ii) Find $L\ [\ e^{-5t}\ cos^2 t\ ]$.

23. Find $L^{-1}\left[\dfrac{5s - 3}{(s-1)(s^2 + 2s + 5)}\right]$.

24. Verify Green's theorem for $\int_C \left(xy + y^2\right) dx + x^2 dy$ where C is the closed curve of the region bounded by the line $y = x$ and the parabola $y = x^2$.

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