B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year IV Semester
Allied Paper -IV
ALLIED MATHEMATICS -II

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

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

Answer any **TEN** questions

1. Find a_0 of the fourier series for f(x) $= \begin{cases} 0 \ for -\pi \leq x \leq 0 \\ x \ for \ 0 < x \leq \pi \end{cases}$
2. Define odd and even function.
3. Eliminate a and b from z=(x+a)(y+b)
4. Define complete integral.
5. Find L(coshat)
6. Find L(t^2e^t)
7. Find $L^{-1}\left(\frac{1}{\left((s+1)^2+1\right)}\right)$
8. State the linear properties of inverse laplace transform.
9. Prove that div $\overline{r} = 3$.
10. State Green's theorem.
11. Solve p+q=x+y.
12. Define Gradient.

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

Answer any **FIVE** questions

13. Obtain the fourier series expansion for e^x in the interval $-\pi < x < \pi$
14. Find the partial differential equation by eliminating the arbitrary functions from $\mathbf{f\left(x+y+z, x^2+y^2-z^2\right)=0}$
15. Find L ($\cos^4 t$)
16. Find $L^{-1}\left(\frac{10}{(s+2)^6}\right)$
17. Find $\phi \ \ if \ \nabla\phi = (6xy + z^3)\overline{i} + \left(3x^2 - z\right)\overline{j} + (3xz^2 - y)\overline{k}$
18. Find the value of a such that $\overline{F}$= (axy-z^2)$\overline{i}$+$\left(x^2 + 2yz\right)\overline{j} + (y^2 - axz)\overline{k}$ is irrotational.
19. Find the complete and singular solution of z= xp+yq+p^2+q^2

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

Answer any **THREE** questions

20. Find the fourier series for f(x) $= \begin{cases} -\pi & for -\pi < x \leq 0 \\ x & for\ 0 < x < \pi \end{cases}$.

    Deduce $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} \ldots\ldots\ldots$

21. Solve$(\mathbf{m}z - \mathbf{n}y)\,\mathbf{p} + (\mathbf{n}x - \mathbf{l}z)\,\mathbf{q} = \mathbf{l}y - \mathbf{n}x.$

22. Find a) $\mathbf{L}\left(\mathbf{s}sin^{\mathbf{2}}\ \mathbf{t}\ \mathbf{c}os^{\mathbf{3}}\mathbf{t}\right)$ b) $\mathbf{L}(\mathbf{te^{-t}c}os\mathbf{3t})$

23. Find $\mathbf{L^{-1}}\left(\frac{\mathbf{s+4}}{\mathbf{s(s-1)(s^2+4)}}\right)$

24. Verify Green's theorem $\int_{\mathbf{c}} \left(\mathbf{x^2 - y^2}\right)\mathbf{d}x + \mathbf{2x}ydy$ where C is the boundary of the region bounded by the lines x=0,x=a,y=0,y=b.

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