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

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

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

Answer any **TEN** questions

1. Define a function.
2. What is an infinite set?
3. Define a convergent sequence.
4. What is an alternating sequence?
5. Define a derivative.
6. Write down the Taylor series formula.
7. Define Laplace transform.
8. Find Laplace transform of [$t^{3/2}$ + cost +1]
9. Find Inverse Laplace transform of [$\frac{1}{s+a}$]
10. State the linear and shifting properties of inverse laplace transform.
11. Find Laplace transform of ($\cos^2$ 2t).
12. Obtain Laplace transform of [$\frac{s}{s^2 - a^2}$]

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

Answer any **FIVE** questions

13. If f : A$\rightarrow$B and if X$\subset B$, Y$\subset B$ then prove that $f^{-1}(X \cup Y) = f^{-1}(X) \cup f^{-1}(Y)$.
14. Show that a nondecreasing sequence which is bounded above is convergent.
15. If f and g has derivatives at c$\in R^1$, then prove that f+g,f-g, fg has a derivative at c.
16. Find Laplace transform of [cosht.sin2t].
17. Evaluate Laplace transform of [$\frac{s}{(s+2)^2}$].
18. Obtain Laplace transform of $\left\{e^t \ (cos2t + \frac{1}{2}sin2t)\right\}$.
19. Find Inverse Laplace transform of $(\frac{1}{s(s^2+a^2)})$.

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

Answer any **THREE** questions

20. If A_1, A_2, A_3,..... are countable sets , then show that $\bigcup_{n=1}^{\infty} A_n$ is countable.
21. Prove that any bounded sequence of real numbers has a convergent subsequence.
22. State and prove Rolle's theorem.
23. Find the following:

    (i) Laplace transform of (e^{-t}sint) (ii) Laplace transform of (sin3t cost)
    (iii) Laplace transform of (e^{-3t} $\cos^3$3t).
24. Obtain the inverse laplace transform $[\frac{1-s}{(s+1)(s^2+4s+13)}]$.