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. Define an uncountable set with a two examples.
2. Define a characteristic function.
3. Define a convergent sequence.
4. If $\sum_{n=1}^{\infty} a_n$ is a convergent series then prove that $\lim_{n\to\infty} a_n = 0$
5. State the Rolle's Theorem.
6. If the real valued function f has a derivative at the point c$\in$ R. Prove that f is continuous at c.
7. Find Laplace transform of sinat.
8. Find Laplace transform of (e^{-2t} t^2).
9. Find Inverse Laplace transform of L^{-1} $(\frac{1}{s+3})$
10. State the value for which Inverse Laplace transform of$(\frac{1}{s+a})$ is valid?
11. Define Cantor set?
12. State Initial value theorem.

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

Answer any **FIVE** questions

13. If f:A$\to$ B and if $X \subset B$, $Y \subset B$. prove that $f^{-1}(X \cup Y) = f^{-1}(X) \cup f^{-1}(Y)$.
14. If $\{S_n\}_{n=1}^{\infty}$ is a sequence of non negative number and if $lim_n \to \infty S_n = L$ Prove that $L \geq 0$.
15. State and prove the Mean value theorem.
16. Find the value of (a) L[sin2t sint] (b) L[tsin2t]
17. Find the inverse of L T of $\frac{s}{s^2+2s+10}$
18. If the sequence of real number $\{s_n^{\infty} n = 1$ prove that $\{s_n^{\infty} n = 1$ is bounded.
19. Find the Laplace transform of $\frac{e^{3t}-}{sin2tt}$

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

Answer any **THREE** questions

20 Prove that the set [0, 1] $= \{x/0 \leq x \leq 1\}$ is uncountable.

21. Prove that the sequence $\{(1 + \frac{1}{n}^n\}_{n=1}^{\infty}$ is convergent.

22. State and prove the Second fundamental theorem of calculus.

23. Evaluate L$\{$te^{-t}sint$\}$

24. Find the inverse Laplace transform of $\frac{4s^2-3s+5}{(s+1)(s-1)(s-2)}$