B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
III Year V Semester
Core Major - Paper X
REAL ANALYSIS

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

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

Answer any **TEN** questions

1. Define Least upper bound.
2. When do you say that a sequence is bounded?.
3. State Ratio test.
4. Define Limit superior.
5. Define Limit of a function
6. When do you say that a function is strictly increasing?.
7. Define open set.
8. Prove that set of all irrationals is of second category.
9. Define measure zero.
10. State Rolle's theorem.
11. Define divergent sequence.
12. Prove that $\sum 1/n$ is divergent

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

Answer any **FIVE** questions

13. Prove that countable union of countable set is countable.
14. Prove that every cauchy sequence of real numbers is bounded .
15. Prove that $lim\sqrt{x+3} = 2$ as $x \to 1$
16. If G_1 and G_2 are open then Prove that $G_1 \cap G_2$ is also open.
17. State and Prove first fundamental theorem of calculus.
18. If $\sum a_n$ is a convergent series then Prove that lim $a_n = 0$ as $n \to \infty$.
19. Prove that if f is continuous at $a \in R$ then $|f|$ is also continuous at a.

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

Answer any **THREE** questions

20. a) Show that [0,1] is uncountable.

    b) Prove every convergent sequence is bounded.

21. State and Prove Root test.

22. a) If lim $f(x) = L$ as $x \to a$ and lim $g(x) = M$ as $x \to a$ then Prove that lim $[f(x) + g(x)] = L + M$ as $x \to a$.

    b) Define Metric space with an example.

23. Prove that the set R^1 is of second category.

24. State and Prove Rolle's Theorem.

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