ADITYA DEGREE COLLEGE

ANDHRA UNIVERSITY, AP

MID-I EAAMINATION

IV SEM B.S.C (MATH MINOR) **Max Marks: 60M**

DATE: 10-02-2025 **REAL ANALYSIS** **Time: 3 Hours**

SECTION - A

I. ANSWER ANY FIVEOF THE FOLLOWING. **5X4=20M**

1) Every convergent sequence is bounded.

2) Discuss the nature sequence is sequence $\{r^n\} forall -1 < r \leq 1.$

3) Prove that $s_n = 2 - \frac{1}{2^{n-1}}$ in convergent.

4) Test for convergent $\sum_{n=1}^{\infty}(\sqrt{n^3+1} - \sqrt{n^3})$

5) Test for convergent $\sum_{n=1}^{\infty} \frac{1.3.5---(2n-1)}{2.4.6---.2n} x^{n-1}$ (x>0)

6) Prove that $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + - - - -$ converges.

7) State prove Bolzano-Weierstrass theorem.

8) An absolutely convergent series is always convergent.

SECTION -B

II.ANSWER THE FOLLOWING QUESTIONS **4 X10=40M**

9) a) State and prove Monotone theorem.

(or)

b) Prove that the sequence $\{s_n\}$ defined by $1+\frac{1}{1!}+\frac{1}{2!}+\text{-----}+\frac{1}{n!}$ is convergent.

State and prove Cauchy's second theorem.

10) a) State and prove D'Alemberts test

(or)

b) State and prove Leibnitz test.

11) a) State and prove Cauchy convergence critenion

(or)

b) State and prove limit comparison test.

12) a) State and prove sandwich theorem.

(or)

b) State and prove Cauchy's n^{th} root test.