Assignment-1

KKSJ MANINAGAR SCIENCE COLLEGE

B. Sc. (Sem-VI)

MAT-308 (Analysis-II)

1. Show (by definition) that $f(x) = 2x$ is Riemann integrable on $[0, 1]$.

2. Prove (Riemann condition) if $f \in R[a, b]$, then

$$U_P(f) - L_P(f) < \epsilon.$$

3. State and prove the First Theorem of Calculus.

4. Test the Convergence of following Series
   (i) $\sum_{n=1}^{\infty} \frac{n^2+1}{2n^4+2n+3}$ (ii) $\sum_{n=2}^{\infty} \frac{1}{n \log n}$ (iii) $\sum_{n=1}^{\infty} \frac{1}{3^{-n}+1}$.

5. State and prove comparison test of the infinite series and discuss the convergence of $\sum_{n=1}^{\infty} \frac{1}{3^n+1}$.

6. State and prove Cauchy's condensation test.

7. Show by definition that $\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \cdots$ is convergent and its sum is 1.

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