B.Sc. DEGREE EXAMINATION,ODD SEMESTER 2020
III Year V Semester
Real Analysis

Max.marks :25

Answer any **FIVE** questions $(5 \times 5 = 25)$ Marks

1. If B is an infinite subset of the countable set A, prove that B is countable.
2. If $\{s_n\}_{n=1}^{\infty}$ is a sequence of real numbers, and if $lim_{n\to\infty}\, sup\ s_n{=}lim_{n\to\infty}\, inf\ s_n{=}L$, $when\ L \in R$, prove that $\{s_n\}_{n=1}^{\infty}$ is convergent and $lim_{n\to\infty}\, s_n = L$.
3. If $\lim\limits_{x\to a} f\,(x) = L$ and $lim_{x\to a}\, g\,(x) = M$, prove that $\lim\limits_{x\to a} [f\,(x) + g\,(x)] = L + M$.
4. If the subset A of the metric space M is totally bounded, prove that A is bounded.
5. State and prove Rolle's theorem.
6. If the sequence of real numbers $\{\mathbf{s_n}\}_{\mathbf{n=1}}^{\infty}$ is convergent, prove that $\{\mathbf{s_n}\}_{\mathbf{n=1}}^{\infty}$ is bounded.
7. State and prove comparison test.