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Fourth SEMESTER

B.Tech. II

Mid SEMESTER EXAMINATION

March, 2019

MC-202, Real Analysis

Time: $1\frac{1}{2}$ Hours

Max. Marks: 25

> Note: Attempt **all** questions and assume the missing values.

(1) Define the *Completeness Axiom* and show that the greatest member of a set, if exists, is the sup of the set.

(2) Define the convergence of a sequence. Prove that the sequence $\left\{\left(1 + \frac{1}{n}\right.\right.$ converges and find the limit.

(3) Define divergent sequence with an example. If $\{s_n\}$ and $\{t_n\}$ are sequences of real numbers, $\{s_n\}$ diverges to infinity and $\{t_n\}$ is bounded, then prove that the sum $\{s_n + t_n\}$ diverges to infinity.

(4) Define Cauchy sequence with an example,. Show that every Cauchy sequence of real numbers is convergent.

(5) Show that the set of all real numbers [0, 1] is uncountable.