

Indraprastha Institute of Information Technology Delhi

IIITD

Quiz-1

Course Title : Real Analysis -1

Time Duration : 45 min

Date of Examination : October 31, 2022

Total Mark : 15

Course Code : MTH-240

Q.1) Show directly from the definition of Cauchy sequences that if $\{x_n\}$ and $\{y_n\}$ are Cauchy sequences, then $\{x_n y_n\}$ is a Cauchy sequence. 4-marks

Q.2) If $x_n = \sqrt{n}$ for all $n \in N$, show that $\{x_n\}$ satisfies $\lim_{n \rightarrow \infty} |x_{n+1} - x_n| = 0$, but that it is not a Cauchy sequence. 4-marks

Q.3) What is Supremum of the set $\{\frac{(n+1)^2}{2^n}; n \in N\}$? 4-marks

Q.5) Let $\{a_n\}$ be a sequence such that $\lim_{n \rightarrow \infty} \frac{a_n}{n} = L$ and $L > 0$, then show that $\{a_n\}$ diverges. 3-marks