

1. Answer any one of the following question. $2 \times 1 = 2$

(a) Define open set and closed set in \mathbb{R} .

(b) Show that a convergent sequence is a Cauchy sequence.

2. Answer any two of the following question $4 \times 2 = 8$

(a) Define limit point of a set. Also show that a finite set has no limit point.

(b) Show that a bounded sequence $\{u_n\}$ is convergent if and only if $\overline{\lim} u_n = \underline{\lim} u_n$

(c) Test the convergence of the series.

$$1 + \frac{x}{1!} + \frac{2^2 x^2}{2!} + \frac{3^3 x^3}{3!} + \dots, x > 0$$