Solution of Demo Quiz

(1) Let $\mathbb{Q}$ be the set of rational numbers. Then $\mathbb{Q} \cup \mathbb{Q}^c =$

(A) The real line (B) $\mathbb{Q}^c$ (C) $\mathbb{Q}$ (D) $\emptyset$

(2) Let K_1, K_2, K_3 and K_4 be supremum, infimum, a lower bound and an upper bound of a set S. Choose the correct option from below:

(A) $K_1 \leq K_2 \leq K_3 \leq K_4$ (B) $K_4 \leq K_3 \leq K_2 \leq K_1$

(C) $K_4 \leq K_2 \leq K_1 \leq K_3$ (D) $K_3 \leq K_2 \leq K_1 \leq K_4$

(We have a lower bound $\leq$ Infimum $\leq$ Supremum $\leq$ an upper bound

(3) Choose the INCORRECT option:

(A) In real number system, every Cauchy sequence is convergent.

(B) In real number system, every convergent sequence is bounded.

(C) In real number system, a Cauchy sequence need not be bounded.

(D) In real number system, a convergent sequence is Cauchy sequence.

(4) Find the limit of sequence whose n^{th} term is given by -

$$a_n = \frac{n}{n^3+1} + \frac{2n}{n^3+2} + \cdots + \frac{n^2}{n^3+n}$$

(A) 0 (B) 1 (C) $\frac{1}{2}$ (D) It is a divergent sequence.

[Ans (C) Tutorial sheet 2 → Question 2 (c)]

(5) What is $V_{0.01}(-2)$?

(A) $(-2.01, -1.99)$ (B) $(-1.99, -2.01)$

(C) $(1.99, 2.1)$ (D) $(-1.99, 2.1)$

Ans $V_\varepsilon(a) \equiv (a-\varepsilon, a+\varepsilon) \quad \forall\ \varepsilon > 0.$

$$V_{0.01}(-2) = (-2-0.01, -2+0.01)$$
$$= (-2.01, -1.99).$$