The Open University of Sri Lanka

B.Sc/B.Ed. Degree Programme – Level 04

Open Book Test (OBT) – 2023/2024

Pure Mathematics

PEU4315 – Continuous Functions

Duration: - One Hour.

Date: - 15.07.2023 **Time: - 02.30 p.m. – 03.30 p.m.**

Answer All Questions

1. (a). Let $f(x) = 5x + 6, x \in [1,2)$. Using the definition of limit of a function prove that $\lim_{x\to 2} f(x) = 16$.

   (b). Let $f(x) = x^2 + 4x + 3$ for each $x \in \mathbb{R}$. Prove that $\lim_{x\to 1} f(x) \neq 6$ using the definition.

2. (a). State whether the following statements **A – C** are **correct** or **incorrect.** Justify your answer.

   A. The set $\{2021,\ 2022,\ 2023\}$ has a limit point.

   B. Let the function $f: E \to \mathbb{R}$ be given by $f(x) = x + 2$, where $E = \{2\} \cup [3, 4)$. Then we cannot discuss the limit of $f(x)$ as x tends to 2.

   C. The set $\left(3, \frac{7}{2}\right) \cup \left(\frac{7}{2}, 4\right)$ is a deleted ε – neighborhood of $\frac{7}{2}$ when $\varepsilon = \frac{1}{2}$.

   (b). Let $A = \left\{\frac{n+1}{2n+2}; n \in \mathbb{N}\right\}$. Is $\frac{1}{2}$ a limit point of A? Justify your answer.

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