The Open University of Sri Lanka

B.Sc./B.Ed. Degree Programme

No Book Test (NBT) – 2021/2022

Pure Mathematics – Level 04

PEU4301 – Real Analysis II

Duration: - One Hour.

Date: - 29.01.2023 **Time: - 09.00 a.m. – 10.00 a.m.**

Answer All Questions

Q1) Let $h: [0, +\infty) \to \mathbb{R}$ be defined by $h(x) = \sqrt{2x^3 + 2}$, $x \in [0, +\infty)$. By using the Chain Rule, show that h is differentiable at $x = 1$ and $h'(1) = \frac{3}{2}$.

[100 Marks]

Q2) Let $f(x) = \frac{1}{x^2}$ for $x \neq 0$. Show that

(i). f is uniformly continuous on $[1, +\infty)$, and

(ii). f is not uniformly continuous on $(0,1]$.

[100 Marks]

Q3) Let $f(x) = x^3, x \in \mathbb{R}$. By using the $\varepsilon - \delta$ definition, show that f is differentiable at $x = 3$ and $f'(3) = 27$.

[100 Marks]

..... End .....