The Open University of Sri Lanka
B.Sc/B.Ed. Degree Programme
Open Book Test (OBT) - 2017/2018
Pure Mathematics - Level 05
PEU5300- Riemann Integration

Open Book Test
Duration: 1 hour
Calculators not allowed

Date: 05th January 2019 Time: 1.00p.m -2.00p.m

Answer all questions

Q1)

(i) Let $f(x) = 3\cos x + 7$ and P be the partition of $\left[\frac{\pi}{2}, \frac{5\pi}{2}\right]$ having four sub-intervals of equal width. Find $U(P, f)$ and $L(P, f)$.

(ii) Let $g: [1,3] \to \mathbb{R}$ be defined by

$$g(x) = \begin{cases} 0, & x \leq 2 \\ 0, & x \in (2,3] \cap \mathbb{Q} \\ 1, & x \in (2,3] \cap \mathbb{Q}^c \end{cases}$$

Prove that g is not Riemann integrable on $[1,3]$.

Q2)

Let $h: [0,3] \to \mathbb{R}$ be defined by

$$h(x) = \begin{cases} 1, & 0 \leq x < 1 \\ 2, & x = 1 \\ 3, & 1 < x \leq 2 \\ 4, & 2 < x \leq 3 \end{cases}$$

(i) Find the lower and upper integrals of h on $[0,3]$.

(ii) Prove that h is Riemann integrable on $[0,3]$ and $\int_0^3 h(x)dx = 8$.

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