The Open University of Sri Lanka
Department of Mathematics
B. Sc/ B. Ed Degree Programme
CAT 2 - 2021/ 2022 (Online Test)
Pure Mathematics- Level 03
PEU3301 – Foundations of Mathematics
Duration: One Hour

Date: 05 – 02 – 2023 **Time: 10.30 a.m. -11.30 a.m.**

Answer All Questions

Q1) By using the Principle of Mathematical Induction, prove that,

(i) for each $n \in \mathbb{N}$, $n(n+1)$ is even, and

(ii) for every positive integer $n \geq 2$, $n^3 - n$ is a multiple of 6.

Q2) Prove that $\inf\left\{\frac{n+1}{n}; n \in \mathbb{N}\right\} = 1$.

Q3) Prove that $\sup(-2,-1) = -1$.

Q4) Solve the following inequality and write down the solution in interval notation:

$$\frac{4x}{x-6} < 1$$

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