



University of Vavuniya

First Examination in Information Technology - 2019

First Semester - December 2020/January 2021

Held on October/November 2021

IT1122 Foundation of Mathematics

Online Examination

Question-Set 1 of 2

- Time Allowed : 30 Minutes
 - This is a closed-book examination.
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1. (a) Suppose A is the set of distinct letters in the word "MATHEMATICS", B is the set of distinct letters in the word "STATISTICS", C is the set of distinct letters in the word "CHEMIST", and D is the set of distinct letters in the word "TACTICS". The universe U is the set of English alphabet. Find each of the following:

- $A \cap B$
- $A \cup (B \cap C)$
- $B \cap (C \cup D)$
- $(A \cup B \cup C \cup D)^c$ [20%]

- (b) Let $A = \{x, y\}$, $B = \{1, 2, 3\}$, and $C = \{a, b\}$. Find each of the following:

- $P(B)$
- $A \times B \times C$ [15%]

[This question is continued on the next page/

- (c) Let $f : \mathbb{R} \longrightarrow \mathbb{R}$ be defined by $f(x) = 3x + 1$. Determine whether the function $f(x)$ is invertible. If so, find the inverse function f^{-1} . [20%]
- (d) Let $f : \mathbb{R} \longrightarrow \mathbb{R}$ and $g : \mathbb{R} \longrightarrow \mathbb{R}$ be defined by $f(x) = 4x - 3$ and $g(x) = x^2 + 2$ for all $x \in \mathbb{R}$. Find $g \circ f$ and $f \circ g$. [20%]
- (e) Let R be the relation on the set $A = \{1, 2, 3, 4, 5\}$. The relation $R: A \longrightarrow A$, $R = \{(1, 1), (2, 2), (2, 3), (3, 2), (4, 2), (4, 4)\}$. Determine whether R is *reflexive*, *symmetric* or *transitive*. [15%]
- (f) Find R^2 if R is a relation from $\{0, 1, 2, 3\}$ to $\{1, 2, 3\}$ where $R = \{(1, 1), (2, 4), (3, 4), (4, 2)\}$. [10%]