

FOUNTAIN UNIVERSITY, OSOGBO
DEPT. OF MATHS & COMPUTER SCIENCES

SECOND SEMESTER MID-TERM TEST 2019/20

CPS 204/DISCRETE STRUCTURES

INSTRUCTIONS: Attempt ALL questions Time Allowed: 45M

1. Given the propositional statement: If you miss the mid-term test, then you fail the course.

(i) Express the above propositions in propositional logic

(ii) Prove or otherwise if the proposition is logically equivalent to "If you do not miss the mid-term test, then you pass the course."

2. Show by constructing truth table or otherwise that the following statements are equivalent

$$p \Rightarrow q \text{ and } \sim(\sim p \wedge q) \wedge p.$$

3. Represent the following propositional statements using Universal " \forall " and existential " \exists " quantifiers

(i) Nobody is perfect

(ii) At least one FWO student is a genius.

4. List the elements of each of the following sets

(i) $\{x \in \mathbb{N} : x^2 < 45\}$ (ii) $\{x \in \mathbb{Z} : x^2 < 45\}$

(iii) $\{x \in \mathbb{R} : x^2 + 2x = 0\}$.

5. Let ~~\mathbb{R}~~ $S = \{1, 2, 3\}$, $T = \{3, 4\}$, $V = \{a, b\}$. Determine the following:

(i) $P(T)$ (ii) $S \times V$ (iii) $S - T$ (iv) \bar{S} .