

THE OPEN UNIVERSITY OF SRI LANKA
B. Sc. DEGREE PROGRAMME: LEVEL 05
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
NO BOOK TEST – 01 (NBT - 1) 2015/2016
CPU3140: MATHEMATICS FOR COMPUTING
DURATION: ONE HOUR ONLY (1 HOUR)



Date: 27th March 2016

Time: 4.00 pm - 5.00 pm

Answer ALL Questions.

- Q1). The connectives \wedge (AND), \vee (OR) and \Rightarrow (IMPLIES) come often not only in computer programs, but also every day speech. But devices that compute the NAND operation are preferable in computer chip designs.
- (I) Give the truth table for \wedge (AND) and using it write the truth table for NAND.
 - (II) What is meant by a function? What are the main components of a function?
 - (III) Every function has some subset of these properties. Define
 - a) Injective
 - b) Surjective
 - c) Bijective
 - (IV) What is a proposition in logic and give an example.
 - (V) Give symbols for the following sets.
 - a) Set of natural numbers.
 - b) Set of integers.
 - c) Set of real numbers.
 - d) Set of complex numbers.
 - (VI) Using set notation for sets A, B and C. Write the Commutative Laws and the Associative Laws.

(VII) What is the Greatest common divisor of (48,72) and the Least common multiple of (10,100)?

(VIII) $f(x)$ and $g(x)$ are two functions given below.

$$f(x): \mathbb{R} \rightarrow \mathbb{R}$$

$$g(x): \mathbb{R} \rightarrow \mathbb{R}$$

$$f(x): x \mapsto x^2 \quad \text{AND}$$

$$g(x): x \mapsto x+1$$

Find($f \circ g$) and ($g \circ f$).

Q2).

- (I) Generate a truth table for the following statement.
 $(p \vee \neg q) \rightarrow (p \wedge q)$.
- (II) Is the above compound proposition a tautology? If your answer is "NO"
Give a justification?
- (III) Is the above proposition logically equivalent or not? Justify your answer.

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