BRAC University
Department of Computer Science and Engineering (CSE)

CSE230: Discrete Mathematics

SET - A Semester: **Spring 2024** Time: **20 minutes**
Examination: **Quiz 1** Full marks: **20**

Name: _____ ID: _____ Section: ____

(There are 4 questions total. You must answer all.)

Q1. Consider the following propositions:

p := "You can access the free wifi"
q := "You are on the 7th floor or above"
r := "You are in a lab room"
s := "You are in the main building"

Now find compound propositions for the statements below:

(a) You can access the free wifi only if you are in the main building when you are on the 7th floor or above.	$p \to (q \to s)$ / $q \to (p \to s)$
(b) You are ~~either~~ in a lab room and you are neither on the 7th floor nor above if you cannot access the free wifi.	~~r ∧ ¬q~~ $\neg p \to (r \wedge \neg q)$

[2+2 marks]

Q2. Determine whether the following statements are Tautology, Contradiction or Contingency:

(a) $\neg(p \leftrightarrow q) \leftrightarrow (p \oplus q)$	Tautology
(b) $\neg(p \wedge q) \to p$	Contingency.

T F

[2+2 marks]

Q3. Translate / Convert these propositions to sentences based on the definitions in Q1:

(a) $s \wedge (q \vee r)$	You are on the 7th floor or above or in a lab room(s) and in the main building.
(b) $(r \to s) \to p$	You can access the wifi when you are in a lab room only if you are in the main building

[2+2 marks]

Q4. Determine whether the following statements are logically equivalent by using truth tables:
(a) $\neg p \to (q \to r)$ (b) $q \to (p \vee r)$ (c) $\neg p \wedge q \wedge \neg r$

[8 marks]

(You may use the back part of the question for answering this.)

End

$\sim p \to (q \to r)$, $q \to (p \vee r)$, $\sim p \wedge q \wedge \sim r$

p	q	r	$\sim p$	$q \to r$	(A)	$p \vee r$	(B)	$\sim r$	(C)
T	T	T	F	T	T	T	T	F	F
T	T	F	F	F	T	T	T	T	F
T	F	T	F	T	T	T	T	F	F
T	F	F	F	T	T	T	T	T	F
F	T	T	T	T	T	T	T	F	F
F	T	F	T	F	F	F	F	T	T
F	F	T	T	T	T	T	T	F	F
F	F	F	T	T	T	F	T	T	F