BRAC University
Department of Computer Science and Engineering (CSE)

CSE230: Discrete Mathematics

SET - B

Semester: **Spring 2024**
Examination: **Quiz 1**

Time: **20 minutes**
Full marks: **20**

Name: _____ ID: _____ Section: _____

(There is 1 question only.)

Q1. Consider the following propositions:

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

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.	$s \rightarrow (p \rightarrow q)$ / $p \rightarrow (s \rightarrow q)$
(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.	$\sim p \rightarrow (r \wedge \sim s)$

[2+2 marks]

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

(a) $(p \oplus q) \leftrightarrow \sim(p \leftrightarrow q)$	Tautology
(b) $\sim(p \wedge q) \rightarrow p$	Contingency

[2+2 marks]

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

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

[2+2 marks]

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

[8 marks]

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

End

a: $p \to (q \to r)$ b: $q \to (\sim p \vee r)$ c: $p \wedge q \wedge \sim r$

p	q	r	$\sim p$	$q \to r$	$p \to (q \to r)$	$\sim p \vee r$	$q \to (\sim p \vee r)$	$p \wedge q \wedge \sim r$
T	T	T	F	T	T	T	T	F
T	T	F	F	F	F	F	F	T
T	F	T	F	T	T	T	T	F
T	F	F	F	T	T	F	T	F
F	T	T	T	T	T	T	T	F
F	T	F	T	F	T	T	T	F
F	F	T	T	T	T	T	T	F
F	F	F	T	T	T	T	T	F

a and b eq. not c.