Department of Computer Science FAST NUCES (KARACHI CAMPUS)	CS211 – Discrete Structures Fall 2019 Semester

QUIZ # 2B

Name: _____ Section: _____ Reg No: _____

Read Carefully:

- There are **7** Problems and **2** pages. Total Marks are **7.5**.
- Time allowed to complete this quiz is **40 Minutes.**
- **WARNING**: Any form of **plagiarism**, **discussions** or use of **mobile-phones** or other **unfair means** will result in receiving ZERO in the quiz.
- **WARNING**: **Stop writing** after the allowed time is over. Any submission after the cut-off time will receive ZERO.

Problem#1 **0.5x3**

For each of these relations on the set {1, 2, 3, 4}, decide whether it is reflexive, whether it is symmetric, whether it is antisymmetric, and whether it is transitive.

a) {(1, 2), (2, 3), (3, 4)} Antisymmetric
b) {(1, 1), (2, 2), (3, 3), (4, 4)} Reflexive, symmetric, antisymmetric, transitive
c) {(1, 3), (1, 4), (2, 3), (2, 4), (3, 1), (3, 4)} None

Problem#2 **0.5x2**

Determine whether the relation R on the set of all integers is reflexive, symmetric, antisymmetric, and/or transitive, where $(x, y) \in R$ if and only if

a) $x \equiv y \pmod 7$ (Reflexive, symmetric, transitive)
b) x is a multiple of y (Reflexive, transitive)

Problem#3 **0.5 + (0.25x5)**

a) List the ordered pairs in the relations on {a, b, c, d} corresponding to these matrices. {(a, c),(b, a),(c, d)(d, b)}

$$\begin{pmatrix} 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 1 & 0 & 0 \end{pmatrix}$$

b) Determine whether the relation represented by the matrices are

NOT reflexive because diagonal is not 1
Is irreflexive because diagonal is not 1
NOT symmetric because we do not have (c, a) for (a, c).
Is antisymmetric because there are no pair (a,b) that go in the opposite direction for each pair.
NOT transitive because we do not have (a, d) for the edges (a, c) and (c, d).

Problem#4 **1x1**

Decrypt the message “Mxolxv Fdhvdu.” that was encrypted using the shift cipher with $k = 3$.

_____

_____

_____

Julius Caesar

Problem#5 **1x1**

Solve the linear equation for x. **$3x \equiv 4 \pmod 7$.**

$x \equiv 6 \pmod 7$, so x =6

Problem#6 **1x1**

Find the inverse of **3 mod 7.**

$-2.3 \equiv 1 \pmod 7$ so, -2 is the inverse

Problem#7- <u>Undertaking</u> **0.25x1**

I pledge on my honour that I have not given or received any unauthorized assistance on this assignment/quiz. I understand that if I do so, my quiz will be cancelled.

Signatures: