Fast**National University of Computer & Emerging Sciences, Karachi  
Fall/Spring/Summer-2011 CS-Department  
MidTerm 1   
23rd February 2017, 10:30 am – 11:30 am**

|  |  |  |
| --- | --- | --- |
| **Course Code: CS211** | **Course Name: Discrete Structures** | |
| **Instructor Name : Jalaluddin Qureshi** | | |
| **Student Roll No:** | | **Group:** |

Instructions:

* Return the question paper. Read each question completely before answering it. There are **5 questions and 1 page.**
* In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
* Invigilators/ instructor can not assist you in understanding the question.
* All the answers must be solved according to the sequence given in the question paper.
* Marks will be awarded iff justifications has been provided.

**Time**: 60 minutes. **Max Marks**: 10mark/question x 5questions = 50 marks

**Part A (Set Theory)**

Question 1:

Using the following relationship: |AUB|=|A|+|B|- |A∩B| (1),

Show that the following can be derived:

|AUBUC|=|A|+|B|+|C|- |A∩B|- |A∩C|- |C∩B|+|A∩B∩C| (2).

Based on this exercise, and using Equation (1) and/or (2) derive the formula for |A U B U C U D|.

Question 2:

If A={2, 3, 4, g, FAST, star}, B={4, f, yoyo, 2, golf, 2}, C={yoyo, 10, 7, f, 4, FAST},   
U = A U B U C U {3, golf, 7, tent, 0, 11}, (Hint: U is the universal set). Find the following, and plot these on a Venn Diagram (by shading appropriate region).

1. Ac∩B (b) (U \B) ∩ Cc
2. (A \ U) U (C\B) (d) (A∩C)c \ B

**Part B (Logic Theory)**

Question 3:

Determine (using appropriate technique) whether the following relationship is correct/ incorrect:

P (Q∨R) (PQ) ∧(PR).

Question 4:

Determine whether the assignment c←c+1 (read as, c is assigned the value given by c plus one) will be executed by the if-statement, where x←5, y←3, z←7.

1. If {(x<y) ∧ (y≤z)} then c←c+1 (b) If {(x=z) ∧ ((x≤z)} then c←c+1

(c) If {(x≥y) ∨ (x<z)} then c←c+1 (d) If {(x≤z) ∨ (y=z)} then c←c+1

Question 5:

Using the algebra of Propositions, simplify the following:

(x∨y∨z) ∧ (x∨y∨z) ∨ (w∧x)

After the simplication, draw its truth table.