**Foundation of Computer Science**

**ETCS-203**

**Assignment 2**

**Q1** Define sets A = {1, . . . , 10}, B = {3, 7, 11, 12}, C = {0, 1, . . . , 20}. Which of the following are propositions?

(1) 1 + 1 = 3

(2) (A ∪ B) ⊆ C

(3) A ∩ B

(4) (8 + 22)3/102

(5) 7 ∈ A

(6) (B ∩ C) ∈ 9

Q2. Let Dx = Dy = {1, 2, 3, 4, 5}.

Define the predicate P(x, y) as P(x, y) := (y ≥ x) or (x + y > 6).

Find the truth sets of the following predicates:

1. P(x, y).

2. ∃xP(x, y)

3. ∃yP(x, y)

4. ∀xP(x, y)

5. ∀yP(x, y)

Q3. What is the DNF of (a −→ b) ∧ (a −→ ¬b)?

Q4. Find the CNF’s of

1. a −→ ¬b

Q5. Let the universe be a social club, and let x and y range over the members of the club. Define the predicate P(x, y) as P(x, y) := x loves y. Translate the following quantified predicates into English sentences

1. ∀x∀y P(x, y)

2. ∃x∃y P(x, y)

3. ∀x∃y P(x, y)

4. ∃x∀y P(x, y)

Q6 Prove that in a group of 700 people, there must be 2 people who have the same first and last initials.