

## Discrete Mathematical Structures (UCS405)

### Tutorial Sheet-1

- 1 Let  $A = \{n : n \in N \text{ and } n=3k+5 \text{ for some } k \in N\}$ . Is  $23 \in A$ ?
- 2 Let  $B = \{1, 2, 3, 4, 5\}$  and  $C = \{3, 4, 5, 6, 7, 8\}$  be subsets of the universal set  $U = \{1, 2, \dots, 9\}$ . Find  $UNION(B, C)$ ,  $INTER(B, C)$ ,  $COMP(C)$ , and  $DIFF(B, C)$ .
- 3 Verify DeMorgan's Laws for the sets  $A = \{1, 2, 3, 4\}$  and  $B = \{3, 5, 6, 8\}$  when the universal set is  $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ .
- 4 At sunnydale high school there are 55 students in either algebra, biology or chemistry class 28 students in algebra class, 30 students in biology class, 24 students in chemistry class, 8 students in both algebra and biology, 16 students in both biology and chemistry, 5 students in both algebra and chemistry. How many students are in all three classes?
- 5 In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Math. How many opt for none of the three subjects?
- 6 If  $A$  and  $B$  are two fuzzy sets with membership functions  $\mu_A(x) = \{0.2, 0.5, 0.6, 0.1, 0.9\}$   $\mu_B(x) = \{0.1, 0.5, 0.2, 0.7, 0.8\}$  Then the value of  $\mu_{A \cap B}$
- 7 If  $A$  and  $B$  are two fuzzy sets with membership functions  $\mu_A(x) = \{0.6, 0.5, 0.1, 0.7, 0.8\}$   $\mu_B(x) = \{0.9, 0.2, 0.6, 0.8, 0.5\}$  Then the value of  $\mu_{\text{Complement } A \cup B}(x)$  will be
- 8 If  $P$  and  $Q$  be two multisets with  $P = \{a, a, a, c, d, d\}$  and  $Q = \{a, a, b, c, c\}$ .  
Find:
  - a)  $P \cup Q$
  - b)  $P \cap Q$
  - c)  $P - Q$
- 9 Out of forty students, 14 are taking English Composition and 29 are taking Chemistry.
  - a) If five students are in both classes, how many students are in neither class?
  - b) How many are in either class?
  - c) What is the probability that a randomly-chosen student from this group is taking only the Chemistry class?
- 10 List all terms in each set
  - a) The set of all positive even numbers less than or equal to 10
  - b) The set of all letters in the word "AUSTRALIA".
  - c) The set of all whole numbers greater than 3 and smaller than 16, and divisible by 3.
  - d) The set of all whole numbers greater than 5 and smaller than 35, and divisible by 5.
  - e) The set of all prime numbers divisible by 3.
  - f) The set of all numbers whose absolute value is equal to 7.