NIRMA UNIVERSITY
Institute Of Technology, Ahmedabad
B.Tech. 3rd CE/IT (ODD 2020-21)
2CS305: Discrete Mathematics
Tutorial -1
Topic-Set Theory

1. For each of these pairs of sets, determine whether the first is a subset of the second, the second is a subset of the first, or neither is a subset of the other.

   a) The set of airline flights from New York to New Delhi, the set of nonstop airline flights from New York to New Delhi.

   b) The set of people who speak English, the set of people who speak Chinese.

   c) The set of students who are in 3rd semester (CSE), the set of students who Study Discrete Mathematics.

2. Solve the following Questions

   a) Set A= {1,2,3 ,4}
      Set B= {1 ,2,2,3,3,4}
      Is set A and B equal. Justify your answer.

   b) What is the power set of {ϕ}?

   c) What is the cardinality of set contains prime number less than 23?

   d) A= {x | x^2 − 3x + 2 = 0}, B = {1,2,2}
      Is set A and B equal. Justify your answer.

3. Consider the following assumptions: S1: All dictionaries are useful.

   S2: John owns only romance novels.

   S3: No romance novel is useful.

   Use a Venn diagram to determine the validity of each of the following
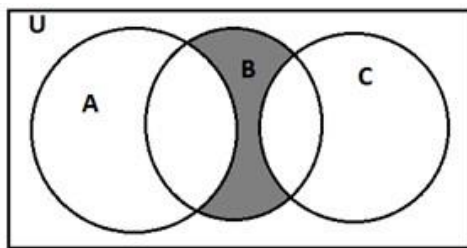
Conclusions:

   a) Romance novels are not dictionaries.
   b) John does not own a dictionary.
   c) All useful books are dictionaries.

4. The shaded area of figure is best described by?

   a) A'(Complement of A)
   b) B – (A ∩ B) – (C ∩ B)
   c) A ∩ C ∩ B
   d) B' (Complement of B)

5. In a class of 200 students, 125 students have taken Discrete mathematics course, 85 students have taken Data Structures course, 65 students have taken Computer Organization course, 50 students have taken both

   Discrete mathematics and Data structure, 35 students have taken both Data Structures and Computer Organization,30 students have taken both Discrete Mathematics and Computer Organizational, 15 students have taken all the three course. How many students have not taken any of the three courses ?

6. Draw neat and clean Venn diagram for below scenario.
In a dinner party many dishes were prepared. Fish and chicken were served under non-vegetarian section . Some took only fish and some only chicken. There were some vegetarians who did not accept either. The rest accepted both fish and meat.

7. Draw neat and clean Venn diagrams for each of these combinations   of the sets A, B, and C.

    a) $A \cap (B \cup C)$
    b) $A \cap B \cap C$
    c) $(A - B) \cup (A - C) \cup (B - C)$

8. Out of a total of 130 students, 60 are wearing hats to class 51 are wearing scarves and 30 are wearing both hats and scarves. Of the 54 student who are wearing sweaters 26 are wearing hats 21 are wearing scarves and 12 are wearing both hats and scarves. Everyone wearing neither a hat nor a scarf is wearing gloves.

a) How many students are wearing gloves?
b) How many students not wearing a sweater are wearing hats but not scarves?

   9. Among 100 students 32 study mathematics,20 study physics,45 study Biology,15 study mathematics and Biology, 7 study mathematics and physics , 10 study physics and Biology and 30 do not study any of the three subjects.

    a) Find the number of students studying all the three subjects
    b) Find the number of student studying exactly one of the three subjects