Tutorial - 5

1. If U = {1, 3, 5, 7, 9, 11, 13}, then which of the following are subsets of U.
   B = {2, 4}
   A = {0}
   C = {1, 9, 5, 13}
   D = {5, 11, 1}
   E = {13, 7, 9, 11, 5, 3, 1}
   F = {2, 3, 4, 5}

2. {x: x is an integer neither positive nor negative} is
   a) Empty set
   b) Non- empty set
   c) Finite set
   d) Both b and c

3. A = {∅,{∅},2,{2,∅},3} ,which of the following is true.
   a) {∅,{∅}} ∈ A
   b) {2} ∈ A
   c) ∅ ⊂ A
   d) 3 ⊂ A

4. The cardinality of the power set of {0, 1, 2 . . ., 10} is_____.

5. The subsets of the set {w, x, y} are {w}, {x}, {y}, {w, x}, {w, y}, {x,y}, {w, x, y}, and { } (the empty subset).

   How many subsets of the set {w, x, y, z} contain w?

6. Let P(S) denotes the power set of set S. Which of the following is always true?
   (a) P(P(S))=P(S)
   (b) P(S) ∩ P(P(S)) = { Ø }
   (c) P(S) ∩ S = P(S)
   (d) S ∉ P(S)

7. State the definitions of the following terms in the predicate form:
   (a) Subset
   (b) Equal Sets
   (c) Proper Subset

8. List the members of these sets.
   (a) {x | x is a real number such that $x^2 = 1$}
   (b) {x | x is a positive integer less than 12}
   (c) {x | x is the square of an integer and x < 100}
   (d) {x | x is an integer such that $x^2 = 2$}

9. Use set builder notation to give a description of each of these sets.
   (a) {0, 3, 6, 9, 12}
   (b) {- 3, -2, - 1, 0, 1, 2, 3}
   (c) {m, n, o, p}

10. For each of the following sets, determine whether 2 is an element of that set.
   (a) {x € R | x is an integer greater than 1}
   (b) {x € R | x is the square of an integer}
   (c) {2, {2}}
   (d) {{2}, {{2}}}
   (e) {{2}, {2, {2}}}
   (f) {{{2}}}

11. In a competition, a school awarded medals in different categories. 36 medals in dance, 12 medals in dramatics and 18 medals in music. If these medals went to a total of 45 persons and only 4 persons got medals in all the three categories, how many received medals in exactly two of these categories?

12. Each student in a class of 40 plays at least one indoor game chess, carrom and scrabble. 18 play chess, 20 play scrabble and 27 play carrom. 7 play chess and scrabble, 12 play scrabble and carrom and 4 play chess, carrom and scrabble. Find the number of students who play (i) chess and carrom. (ii) chess, carrom but not scrabble.

13. Find the number of positive integers not exceeding 100 that are either odd or the square of an integer.