Time : 1 Hour 30 Minute	STD 11 Science Maths Chapter Based Test	Total Marks : 40

SECTION A

* Choose the right answer from the given options. [1 Marks Each] [7]

1. The number of elements of the set $\{x : x \in Z, x^2 = 1\}$ is:

   (A) 3   (B) 2   (C) 1   (D) 0

2. Empty set is a?

   (A) Finite Set   (B) Invalid Set

   (C) Infinite Set   (D) None of the above

3. If A = {2, 3, 4, 5, 7}, B = {7, 8, 9}, then find n(A ∪ B).

   (A) 1   (B) 3   (C) 5   (D) 7

4. Let A = {1, 2, 3, 4, 5, 6}.How many subsets of A can be formed with just two elements, one even and one odd?

   (A) 6   (B) 8   (C) 9   (D) 10

5. If n(A) denotes the number of elements in set A and if n(A) = 4, n(B) = 5 and n(A ∩ B) = 3 then n[(A × B) ∩ (B × A)]=

   (A) 8   (B) 9   (C) 10   (D) 11

6. Given A = {a, b, c, d, e, f, g, h} and B = {a, e, i, o, u} then B - A is equal to:

   (A) {i, o, u}   (B) {a, b, c}   (C) {c, d, e}   (D) {a, i, z}

7. In a certain group of 36 people, 18 are wearing hats and 24 are wearing sweaters. If six people are wearing neither a hat nor a sweater, then how many people are wearing both a hat and a sweater?

   (A) 30   (B) 22   (C) 12   (D) 8

* A statement of Assertion (A) is followed by a statement of Reason (R). [2]
**Choose the correct option.**

8. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

   Assertion: The power set of the set {1, 2} is the set $\{\phi, \{1\}, \{2\}, \{1, 2\}\}$.

   Reason: The power set is set of all subsets of the set.

   a. A is true, R is true; R is a correct explanation of A.
   b. A is true, R is true; R is not a correct explanation of A.
   c. A is true; R is false.
   d. A is false; R is true.

9. **Directions:** In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

   Assertion: If $A \subset B$ for any two sets A and B.
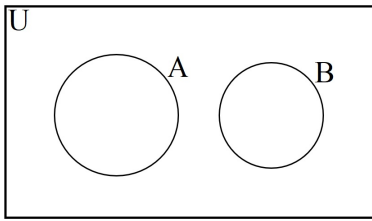
Then, above Venn diagram represents correct relationship between A and B.

Reason: If $A \subset B$, then all elements of A is also in B.

    a.   A is true, R is true; R is a correct explanation of A.
    b.   A is true, R is true; R is not a correct explanation of A.
    c.   A is true; R is false.
    d.   A is false; R is true.

* **Answer the following questions in one sentence. [1 Marks Each]**   **[3]**

10. Write the interval (6, 12] in set builder form.

11. If A = {x : x is a natural number}, B = {x : x is an even natural number}, C = {x : x is an odd natural number} and D = {x : x is a prime number}, find: $A \cap D$

12. Show that the given set that is A = {n : n ∈ Z and n² ≤ 4} and B = {x : x ∈ R and x² – 3x + 2 = 0} are equal or not? Justify your answer.

SECTION B

* **Given section consists of questions of 2 marks each.**   **[8]**

1. If U = {1, 2, 3, 4, 5, 6, 7, 8, 9}, A = {2, 4, 6, 8} and B= {2, 3, 5, 7}, verify that: (A ∪ B)' = A' ∩ B'

2. Find sets A, B and C such that $A \cap B, B \cap C$ and $A \cap C$ are non-empty sets and $A \cap B \cap C = \phi$

3. In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee.

4. Find the pairs of equal sets, if any, give reasons: A = {0}, B = {x : x > 15 and x < 5}, C = {x : x – 5 = 0}, D = {x: x² = 25}, E = {x : x is an integral positive root of the equation x² – 2x –15 = 0}

SECTION C

* **Given section consists of questions of 3 marks each.**   **[12]**

1. Show that the following four conditions are equivalent :

    i.   A ⊂ B
    ii.   A – B = ϕ
    iii.   A ∪ B = B
    iv.   A ∩ B = A

2. Let A and B are sets. If $A \cap X = B \cap X = \phi$ and $A \cup X = B \cup X$ for some set X. Show that A = B.

[Hints A = A ∩ (A ∪ X) , B = B ∩ (B ∪ X) and use Distributive law]

3. In a survey it was found that 21 people liked product A, 26 liked product B and 29 liked product C. If 14 people liked products A and B, 12 people liked products C and A, 14 people liked products B and C and 8 liked all the three products. Find how many liked product C only?

4. In a class of 35 students, 24 like to play cricket and 16 like to play football. Also, each student likes to play at least one of the two games. How many students like to play both cricket and football?

SECTION E

* **Case study based questions** [8]

1. The school organised a cultural event for 100 students. In the event, 15 students participated in dance, drama and singing. 25 students participated in dance and drama; 20 students participated in drama and singing; 30 students participated in dance and singing. 8 students participated in dance only; 5 students in drama only and 12 students in singing only.

Based on the above information, answer the following questions.

i. The number of students who participated in dance, is:
   a. 18
   b. 30
   c. 40
   d. 48

ii. The number of students who participated in drama, is:
   a. 35
   b. 30
   c. 25
   d. 20

iii. The number of students who participated in singing, is:
   a. 42
   b. 45
   c. 47
   d. 37

iv. The number of students who participated in dance and drama but not in singing, is:
   a. 20
   b. 5
   c. 10
   d. 15

v. The number of students who did not participate in any of the events, is:
   a. 20
   b. 30
   c. 25
   d. 35

2. In a library, 25 students read physics, chemistry and mathematics books. It was found that 15 students read mathematics, 12 students read physics while 11 students read chemistry. 5 students read both mathematics and chemistry, 9 students read physics and mathematics. 4 students read physics and chemistry and 3 students read all three subject books.

Based on the above information, answer the following questions.

   i. The number of students who reading only chemistry is:
     a. 5
     b. 4
     c. 2
     d. 1

   ii. The number of students who reading only mathematics is:
     a. 4
     b. 3
     c. 5
     d. 11

   iii. The number of students who reading only one of the subjects is:
     a. 5
     b. 11
     c. 8
     d. 6

   iv. The number of students who reading atleast one of the subject is:
     a. 20
     b. 22
     c. 23
     d. 21

   v. The number of students who reading none of the subject is:
     a. 2
     b. 4
     c. 3
     d. 5

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