Sets

Assertion Reason Questions

Direction: In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R).
Choose the correct answer out of the following choices.
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

1. Assertion (A): The set D= {x:x is even prime number} in roster form is {2,3}.
Reason (R): The set E = the set of all letters in the word: 'SCHOOL', in the roster form is {S, C, H, O, L}.

Ans. (d) (A) is false but (R) is true.
Explanation: We can see that 2 is the only even prime number here. So,
D= {x:x is even prime number} = {2}
Thus, the given roster form of set D is wrong.
There are 6 letters in the word 'SCHOOL' out of which letter O is repeated.
Hence, set E in the roster form is {S, C, H, O, L}.

2. Assertion (A): The set {1, 8, 27,..., 1000} in the set-builder form is
{x: $x = n^3$, where n = N and $1 < n \leq 10$}.
Reason (R): In roster form, the order in which the elements are listed is immaterial.

Ans. (b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
Explanation: We can see that each member in the given set is the cube of a natural number.
Hence, the given set in the set-builder form is {x: $x = n^3$, where ne N and $1 \leq n \leq 10$}. Also, in roster form, the order in which the elements are listed is immaterial.

3. Assertion (A): The set {x: x is a month of a year not having 30 days} in roster form is {January, February, March, May, July, August, October, December}.
Reason(R): A collection of objects is called set.

Ans. (c) (A) is true but (R) is false.

Explanation: The months not containing 30 days are January, February, March, May, July, August, October, and December. So, the roster form of a given set = {January, February, March, May, July, August, October, December}, which is a well-defined collection of months. R is wrong as mere collection of objects is not a set. the collection should be well defined.

4. Assertion (A): The set A = {a, e, i, o, u} is a finite set.
Reason (R): Finite set has finite number of elements.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: We have a set that is empty or consists of a definite number of elements is called a finite set. Here, set A = {a, e, i, o, u} which contains 5 elements. So, it is a finite set.

5. Assertion (A): Let A = {2, 3, 4} and B = {1, 2, 3, 4} Then $A \subset B$
Reason (R): If every element of set A is also an element of set B, then A is a subset of B.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Since, every element of A is in B so $A \subset B$.