ASSERTION REASONING QUESTIONS

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

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

1. Assertion : Rational number lying between two rational numbers x and y is $\frac{1}{2}(x + y)$.

Reason : There is one rational number lying between any two rational numbers.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Ans: We know that there are infinitely many rational numbers between any two given rational numbers.

So, Reason is not correct.

One of the rational number lying between two rational numbers x and y is $\frac{1}{2}(x + y)$.

So, Assertion is correct

Correct option is (c) Assertion (A) is true but reason (R) is false.

2. Assertion : 5 is a rational number.
Reason : The square roots of all positive integers are irrationals.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Ans : Here reason is not true.
$\sqrt{4} = \pm 2$, which is not an irrational number.
Correct option is (c) Assertion (A) is true but reason (R) is false.

3. Assertion : Sum of two irrational numbers $2 + \sqrt{3}$ and $4 + \sqrt{3}$ is irrational number.

Reason : Sum of two irrational numbers is always an irrational number.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Ans : Here, $2 + \sqrt{3} + 4 + \sqrt{3} = 6 + 2\sqrt{3}$ which is an irrational number.

So, Assertion is correct.

Now, $2 + \sqrt{3}$ and $4 - \sqrt{3}$ are two irrational numbers

Sum $= 2 + \sqrt{3} + 4 - \sqrt{3} = 6$ which is a rational number.

So, Reason is not correct.

Correct option is (c) Assertion (A) is true but reason (R) is false.

4. Assertion : Sum of two irrational numbers $2 + \sqrt{3}$ is an irrational number.
Reason : Sum of a rational number and an irrational numbers is always an irrational number.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Ans : We know that the sum of a rational number and an irrational numbers is always an irrational number.
So, Reason is correct.
Now, $2 + \sqrt{3}$ is an irrational numbers
So, Assertion is also correct.
Correct option is (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

5. Assertion : $11^3 \times 11^4 = 11^{12}$

Reason : If $a > 0$ be a real number and p and q be rational numbers.

Then $a^p \times a^q = a^{p+q}$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Ans : We know that If $a > 0$ be a real number and p and q be rational numbers then $a^p \times a^q = a^{p+q}$.

So, Reason is true.

Now, $11^3 \times 11^4 = 11^{3+4} = 11^7$

Here assertion is incorrect but reason is correct.

Correct option is (d) Assertion (A) is false but reason (R) is true.

6. Assertion : $7^8 \div 7^4 = 7^4$

Reason : If $a > 0$ be a real number and p and q be rational numbers.
Then $a^p \times a^q = a^{p+q}$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Ans : We know that If $a > 0$ be a real number and p and q be rational numbers then $a^p \times a^q = a^{p+q}$.
So, Reason is correct.
Now, $7^8 \div 7^4 = 7^{8-4} = 7^4$ $(\because a^p \div a^q = a^{p-q})$
So, Assertion is also correct.
But reason (R) is not the correct explanation of assertion (A)
Correct option is (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

7. Assertion : Rational number lying between $\frac{1}{4}$ and $\frac{1}{2}$ is $\frac{3}{8}$.

Reason : Rational number lying between two rational numbers x and y is $\frac{1}{2}(x\ y)$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Ans: We know that Rational number lying between two rational numbers x and y is $\frac{1}{2}(x + y)$.

So, Reason is not correct.

Now, $\frac{1}{2}\left(\frac{1}{4} + \frac{1}{2}\right) = \frac{1}{2}\left(\frac{1+2}{4}\right) = \frac{3}{8}$

So, Assertion is correct

Correct option is (c) Assertion (A) is true but reason (R) is false.

8. Assertion : √5 is an irrational number.
Reason : A number is called irrational, if it cannot be written in the form p/q, where p and q are integers and $q \neq 0$.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Ans : We know that "A number is called irrational, if it cannot be written in the form p/q, where p and q are integers and $q \neq 0$."
So, Reason is correct.
Since, √5 cannot be written in the form of p/q, therefore it is an irrational number.
Hence assertion is correct follows from reason.
Correct option is (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

9. Assertion : 0.329 is a terminating decimal.
Reason : A decimal in which a digit or a set of digits is repeated periodically, is called a repeating, or a recurring, decimal.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Ans : We know that a decimal in which a digit or a set of digits is repeated periodically, is called a repeating, or a recurring, decimal.
So, Reason is correct.
Also, we know that a decimal that ends after a finite number of digits is called a terminating decimal.
Hence Assertion is correct but reason is not the correct explanation of Assertion
Correct option is (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

10. Assertion : The rationalizing factor of $3 + 2\sqrt{5}$ is $3 - 2\sqrt{5}$.

Reason : If the product of two irrational numbers is rational then each one is called the rationalising factor of the other.

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Ans : We know that If the product of two irrational numbers is rational then each one is called the rationalising factor of the other.

So, Reason is correct.

Now, $(3 + 2\sqrt{5}) \times (3 - 2\sqrt{5}) = 3^2 - (2\sqrt{5})^2$

$= 9 - 20 = -11$

So, both Assertion and Reason are correct and Reason explains Assertion.

Correct option is (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).