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 : When a positive integer a is divided by 4, the values of remainder can be 0, 1, 2 or 3.

Reason : According to Euclid's Division Lemma $a = bq + r$, where $0 \leq r < b$ and r is an integer.

(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: Given positive integers A and B, there exists unique integers 'q' and 'r' satisfying $a = bq + r$, where $0 \leq r < b$.

This is known as Euclid's Division Lemma.

So, both A and R are correct and R explains A.

Correct option is (a)

2. Assertion : The HCF of two numbers is 18 and their product is 3072. Then their LCM = 169.

Reason : If *a*, *b* are two positive integers, then HCF x LCM = *a* x *b*.

(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 true [standard result]

Assertion is false.

We know that for any two numbers, Product of the two numbers = HCF x LCM

HCF x LCM = 18 x 169 = 3042 ≠ 3072

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

3. Assertion : 12^n ends with the digit zero, where n is natural number.
Reason : Any number ends with digit zero, if its prime factor is of the form $2^m \times 5^n$, where m, n are natural 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 : $12^n = (2 \times 2 \times 3)^n = 2^n \times 2^n \times 3^n$,
Its prime factors do not contain 5^n i.e., of the form $2^m \times 5^n$, where m, n are natural numbers.
Here assertion is incorrect but reason is correct.
Correct option is (d) Assertion (A) is false but reason (R) is true.

4. Assertion : $\frac{29}{625}$ is a terminating decimal fraction.

Reason : If $q = 2^m \times 5^n$ where n, m are non-negative integers, then p/q is a terminating decimal fraction.

(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 : Since the factors of the denominator 625 is of the form $2^0 \times 5^4$.

$\frac{29}{625}$ is a terminating decimal

Since, assertion 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).

5. Assertion : Denominator of 12.145. When expressed in the form p/q, $q \neq 0$, is of the form $2^m \times 5^n$, where m, n are non-negative integers.
Reason : 12.145 is a terminating decimal fraction.

(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 : $12.145 = \frac{12145}{1000} = \frac{12145}{2^3 \times 5^3}$
Its denominator is of the form $2^m \times 5^n$, where $m = 3$, $n = 3$
Hence, assertion is true.
Since reason gives assertion
Correct option is (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

6. Assertion : $\sqrt{x}$ is an irrational number, where *x* is a prime number.
Reason : Square root of any prime number is 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 : As we know that square root of every prime number is an irrational number.
So, both A and R are correct and R explains A.
Correct option is (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

7. Assertion : For any two positive integers *a* and *b*, HCF (*a*, *b)* x LCM (*a*, *b)* = *a x b*
Reason : The HCF of two numbers is 8 and their product is 280. Then their LCM is 40.

(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 : HCF (*a*, *b)* x LCM (*a*, *b)* = *a x b*

$\Rightarrow 8 \times LCM = 280$

$\Rightarrow LCM = \frac{280}{8} = 35$

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

8. Assertion : 3 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.

$\sqrt{9} = \pm 3$, which is not an irrational number.

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