Real Numbers

Assertion & Reason Type Questions

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option:

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.

Q 1. Assertion (A): 11 x 4 x 3 x 2 + 4 is a composite number.

Reason (R): Every composite number can be expressed as product of primes.

Answer : (a) **Assertion (A):** We have, 11 x 4×3×2+4

=(11×3×2+1)4=67x4=67 x 2^2

The given number can be expressed as product of primes. So, it is a composite number.

:- Assertion (A) is true.

Reason (R): It is true to say that every composite number can be expressed as product of primes. Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 2. Assertion (A): For no value of n, where n is a natural number, the number 8" ends with the digit zero.

Reason (R): The prime factorisation of a natural number is not unique, except for the order of its factors.

Answer : (c) **Assertion (A):** We have, $8^n = (2^3)^n = 2^{3n}$, so the only prime in the factorisation of 8" is 2. So, from the uniqueness of the Fundamental Theorem of Arithmetic, we can say that there are no other prime factorisation of 8^n. So, there is no natural number n for which 8^n ends with the digit zero. So, Assertion (A) is true.

Reason (R): It is not true.

Hence, Assertion (A) is true but Reason (R) is false.

Q 3. Assertion (A): √a is an irrational number, where a is a prime number.
Reason (R): Square root of any prime number is an irrational number.

Answer : (a) **Assertion (A):** As we know that square root of every prime number is an irrational number. So, it is a true statement.
Reason (R): It is also true.
Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 4. Assertion (A): If HCF of two numbers is 5 and their product is 150. Then their LCM is 40.
Reason (R): For any two positive integers a and b, HCF (a, b) x LCM (a, b) = axb

Answer : (d) **Assertion (A):** Product of two numbers

$$= \text{HCF} \times \text{LCM of two numbers}$$

$$\therefore \quad 150 = 5 \times \text{LCM}$$

$$\Rightarrow \text{LCM} = \frac{150}{5} = 30$$

So, Assertion (A) is false.
Reason (R): It is a true statement.
Hence, Assertion (A) is false but Reason (R) is true.

Q 5. Assertion (A): If product of two numbers is 5780 and their HCF is 17, then their LCM is 340.
Reason (R): HCF is always a factor of LCM.

Answer : (b) **Assertion (A):** Given, product of numbers = 5780
and HCF = 17
:- 17 x LCM = 5780
LCM = 340
So, Assertion (A) is true.
Reason (R): It is also true.
Hence, both Assertion (A) and Reason (R) are true
but Reason (R) is not the correct explanation of Assertion (A).

Q.6. Assertion (A) : $\frac{13}{3125}$ is a terminating decimal fraction.

Reason (R) : If $q = 2^m 5^n$ where m n, are non-negative integers, then $\frac{p}{q}$ is a terminating decimal fraction.

Answer : (a)

We have $3125 = 5^5 = 5^5 \times 2^0$
Since the factors of the denominator 3125 is of the form $2^0 \times 5^5$, $\frac{13}{3125}$ is a terminating decimal

Q.7. Assertion (A) : 34.12345 is a terminating decimal fraction.

Reason (R) : Denominator of 34.12345, when expressed in the form $\frac{p}{q}$, $q \neq 0$, is of the form $2^m \times 5^n$, where m and n are non-negative integers.

Answer : (a)

$$34.12345 = \frac{3412345}{100000} = \frac{682469}{20000} = \frac{682469}{2^5 \times 5^4}$$

Its denominator is of the form $2^m \times 5^n$, where $m = 5$ and $n = 4$ which are non-negative integers.

Q.8. Assertion (A) : The HCF of two numbers is 5 and their product is 150, then their LCM is 30

Reason (R) : For any two positive integers a and b, HCF (a,b) + LCM (a,b) = a × b.

Answer : (c) We have,

$$\begin{aligned} \text{LCM}(a, b) \times \text{HCF}(a, b) &= a \times b \\ \text{LCM} \times 5 &= 150 \\ \text{LCM} &= \frac{150}{5} = 30 \end{aligned}$$