

Continuity And Differentiability

Part - 3

ASSERTION-REASON QUESTIONS

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 and R is also false.

1. **Assertion (A) :** If $f(x).g(x)$ is continuous at $x = a$, then $f(x)$ and $g(x)$ are separately continuous at $x = a$.

Reason (R) : Any function $f(x)$ is said to be continuous at $x = a$, if $\lim_{h \rightarrow 0} f(a + h) = f(a)$.

2. **Assertion (A) :** If $f(x)$ and $g(x)$ are two continuous functions such that $f(0) = 3$, $g(0) = 2$, then $\lim_{x \rightarrow 0} \{f(x) + g(x)\} = 5$.

Reason (R) : If $f(x)$ and $g(x)$ are two continuous functions at $x = a$ then $\lim_{x \rightarrow a} \{f(x) + g(x)\} = \lim_{x \rightarrow a} f(x) + \lim_{x \rightarrow a} g(x)$.

3. **Assertion (A) :** $|\sin x|$ is a continuous function.

Reason (R) : If $f(x)$ and $g(x)$ both are continuous functions, then $gof(x)$ is also a continuous function.

4. **Assertion (A) :** If $y = \sin x$, then $\frac{d^3 y}{dx^3} = -1$ at $x = 0$.

Reason (R) : If $y = f(x) \cdot g(x)$, then $\frac{dy}{dx} = f(x) \cdot \frac{d}{dx} g(x) + g(x) \frac{d}{dx} f(x)$.

Answers

1. (d) 2. (a) 3. (a) 4. (b)