CBSE POINT, BALASORE

WEEKLY EXAMINATION (2025-26)
SUBJECT-MATHEMATICS

TIME: 1 HR   **CLASS-XI**   **FM-24**

Section – A   [1×4]

1. $\lim\limits_{x-\pi} \sin \frac{\sin x}{x-\pi}$ is equal to

(a) 1   (b) 2   (c) -1 (d) -2

2. $\lim\limits_{x\to 0} \left(\frac{x^2 \cos x}{1-\cos x}\right)$ is equal to

(a) 2   (b) $\frac{3}{2}$ (c) $-\frac{3}{2}$ (d) 1

The following questions consist of two statements – Assertion(A) and Reason(R). Answer these questions selecting the appropriate option given below:
(a) Both A and R is true and R is the correct explanation for A.
(b) Both A and R is true and R is not the correct explanation for A.
(c) A is true but R is false.
(d) A is false but R is true.

3. Assertion(A): $\lim\limits_{x\to 0} \frac{\sin mx}{\sin nx} = \frac{m}{n}$

Reason(R): $\lim\limits_{x\to 0} \frac{\sin ax}{ax} = 1$

4. Assertion(A): $\lim\limits_{x\to 0} (\operatorname{cosec} x - \cot x) = 0$

Reason(R): $\lim\limits_{x\to\frac{\pi}{2}} \frac{\tan 2x}{x-\frac{\pi}{2}} = 1$

Section – B   [2×10]

5. Evaluate $\lim\limits_{x\to -2} \frac{\frac{1}{x}+\frac{1}{2}}{x+2}$.

6. Evaluate : $\lim\limits_{x\to\sqrt{2}} \frac{x^4-4}{x^2+3x\sqrt{2}-8}$

7. Find n if $\lim\limits_{x\to 2} \frac{x^n-2^n}{x-2} = 80$, n being a positive integer.

8. Prove that the derivative of $\sin x$ with respect to x is $\cos x$ i.e., $\frac{d}{dx}(\sin x) = \cos x$.

9. Find the value of k, if $\lim\limits_{x\to 1} \frac{x^4-1}{x-1} = \lim\limits_{x\to k} \frac{x^3-k^3}{x^2-k^2}$.

10. If $y = \sqrt{x} + \frac{1}{\sqrt{x}}$ then show that $2x\frac{dy}{dx} + y = 2\sqrt{x}$.

11. If $f(x) = \alpha x^n$ then prove that $\alpha = \frac{f'(1)}{n}$.

12. Find the derivative of $\frac{x^n-a^n}{x-a}$ for some constant a.

[Limits and Derivatives]

13. Find the derivative of

(i) $2x - \frac{3}{4}$

(ii) $x^5(3 - 6x^{-9})$

14. Find the derivative of the following functions:

(i) $\sin x \cos x$

(ii) $2 \tan x - 7 \sec x$

[Limits and Derivatives]