CHAPTER

5

Syllabus

Explanation: Given that,

$$f(x) = \cot x$$

It is discontinuous at

$$\sin x = 0$$

$$\Rightarrow \quad x = n\pi,$$

Thus, the given function is

$$\{x = n\pi : n \in Z$$

Q. 4. If $f(x) = \begin{cases} mx + 1 & \text{if } x \leq \dfrac{\pi}{2} \\ \sin x + n, & \text{if } x > \dfrac{\pi}{2} \end{cases}$, is

then

(A) $m = 1, n = 0$ **(B)**

(C) $n = \dfrac{m\pi}{2}$ **(D)**

The functions e^x and $|x$
functions for all real value o
Since e^x is differentiable ev
non-differentiable at $x = 0$.

Thus, the given functions $f($

everywhere but not differen

Q. 9. Let $f(x) = |\sin x|$, then

(A) f is everywhere differenti

(B) f is everywhere co
differentiable at $x = n\pi$, n

(C) f is everywhere continuou
at $x = (2n + 1)\dfrac{\pi}{2}$, $n \in Z$.

(D) none of these

Ans. Option (B) is correct.

Explanation: Given that,

$$f(x) = |\sin$$

The functions $|x|$ and $\sin$

Explanation: Given that,

$x = t^2$ and $y = t^3$

Then, $\frac{dx}{dt} = 2t$ and $\frac{dy}{dt}$ =

ASSERTION

Directions: In the following q
of Assertion (A) is followe
Reason (R). Mark the correct

(A) Both A and R are true a
explanation of A

(B) Both A and R are true but
explanation of A

Explanation: Since sin x and
functions in R, $|\sin x|$ is con
Hence A is true.

$$|\sin x| = \begin{cases} -\sin x, & \text{if } x < 0 \\ \sin x, & \text{if } x \geq 0 \end{cases}$$

$$f(0) = |\sin 0| = 0$$

$$\text{LHD} = f'(0^-) = \lim_{x \to 0} \frac{-\sin}{}$$

$$= -1$$

$$\text{RHD} = f'(0^+) = \lim_{x \to 0} \frac{\sin x}{x}$$

$$= 1$$

At $x = 0$, LHD $\neq$ RHD.
So $f(x)$ is not differentiable a
Hence R is false.

Q. 6. Assertion (A): $f(x) = [x]$ is not
Reason (R): $f(x) = [x]$ is not co

Q. 3. $\frac{d}{dx}(\sin^3 x) =$ _____.

(A) $\cos^3 x$ **(B)**

(C) $3\sin^2 x \cos x$ **(D)**

Ans. Option (C) is correct.

Explanation:

$$\frac{d}{dx}(\sin^3 x) = 3\sin^2 x \frac{d}{dx}$$

$$= 3\sin^2 x \cos$$

Q. 4. $\frac{d}{dx}\sin x^3$ _____.

(A) $\cos(x^3)$ **(B)**

(C) $3x^2 \sin(x^3)$ **(D)**

Ans. Option (D) is correct.

Explanation:

$$\frac{d}{dx}(\sin x^3) = \cos x^3 \frac{d}{dx}(x$$