

PHYSICS

Q.1 $\frac{d}{dx} \sqrt{\sin 2x}$

- (A) $(\sin 2x)^{-1/2}$ (B) $\cos 2x (\sin 2x)^{-1/2}$
 (C) $2 \cos 2x (\sin 2x)^{-1/2}$ (D) $\cos 2x (\sin 2x)^{1/2}$

[B]

Q.2 $\frac{d}{dx} \sqrt{\tan x}$

- (A) $2 \sec^2 x (\tan x)^{-1/2}$ (B) $\frac{1}{2} \sec^2 x (\tan x)^{-1/2}$

- (C) $\frac{1}{2} (\tan x)^{-1/2}$ (D) $2 (\tan x)^{-1/2}$ [B]

Q.3 $\frac{d}{dx} \sin(\log x)$

- (A) $\cos(\log x)$ (B) $\log(\cos x)$
 (C) $x \cos(\log x)$ (D) $\frac{\cos(\log x)}{x}$ [D]

Q.4 $\frac{d}{dx} \sqrt{2x^2 + 1}$

- (A) $2x(2x^2 + 1)^{1/2}$ (B) $2x(2x^2 + 1)^{-1/2}$
 (C) $(2x^2 + 1)^{1/2}$ (D) $(2x^2 + 1)^{-1/2}$ [B]

Q.5 $\frac{d}{dx} e^{\sqrt{2x}}$

- (A) $\frac{e^{\sqrt{2x}}}{\sqrt{2x}}$ (B) $\sqrt{2x} e^{\sqrt{2x}}$
 (C) $e^{\sqrt{2x}}$ (D) $e^{(2x)^{-1/2}}$ [A]

Q.6 $\frac{d}{dx} (x^4 - 2 \sin x + 3 \cos x)$

- (A) $4x^3 - 2 \cos x + 3 \sin x$
 (B) $3x^2 + 2 \cos x + 3 \sin x$
 (C) $4x^3 + 2 \cos x - 3 \sin x$
 (D) $4x^3 - 2 \cos x - 3 \sin x$ [D]

Q.7 $\frac{d}{dx} (x^2 \sin x \log x)$

- (A) $2x \sin x \log x + x^2 \cos x \log x + x \sin x$
 (B) $x^2 \sin x \log x + 2x \cos x \log x + x \sin x$
 (C) $2x \sin x \log x + x^2 \cos x \log x + \sin x$
 (D) None of these [A]

Q.8 $\frac{d}{dx} \frac{(x^2 + 1)}{x + 1}$

- (A) $\frac{x^2 + 2x - 1}{(x + 1)^2}$ (B) $\frac{x^2 - 2x + 1}{(x + 1)^2}$
 (C) $\frac{x^2 + 2x - 1}{x + 1}$ (D) $\frac{x^2 + 2x + 1}{(x + 1)^2}$ [A]

Q.9 $xy = e^2$, then $\frac{dy}{dx}$

- (A) $\frac{x}{y}$ (B) $\frac{y}{x}$ (C) $-\frac{x}{y}$ (D) $-\frac{y}{x}$ [D]

Q.10 $x = at^2$; $y = 2at$, then $\frac{dy}{dx}$

- (A) t (B) $\frac{1}{t}$ (C) 1 (D) none [B]

Q.11 $\int (1-x) \sqrt{x} dx$

- (A) $\frac{2}{3} x^{3/2} + \frac{2}{5} x^{5/2} + C$
 (B) $-\frac{2}{3} x^{3/2} + \frac{2}{5} x^{5/2} + C$
 (C) $-\frac{2}{3} x^{3/2} - \frac{2}{5} x^{5/2} + C$
 (D) $+\frac{2}{3} x^{3/2} - \frac{2}{5} x^{5/2} + C$ [D]

Q.12 $\int \frac{\operatorname{cosec}^2 x dx}{1 + \cot x}$

- (A) $-\log |1 + \cot x| + C$
 (B) $\log |1 + \cot x| + C$
 (C) $\log |1 + \tan x| + C$
 (D) $-\log |1 + \tan x| + C$ [A]

- Q.13** $\int \frac{\log x}{x} \cdot dx$
 (A) $\log x + C$ (B) $\frac{(\log x)^2}{2} + C$
 (C) $-\frac{(\log x)^2}{2} + C$ (D) $-\log x + C$ [B]

- Q.14** $\int_0^1 xe^x dx$
 (A) 0 (B) 1 (C) e (D) e^{-1} [B]

- Q.15** $\int_0^{\pi/2} (\sin x + \cos x) dx$
 (A) 2 (B) 1 (C) 3 (D) 4 [A]

- Q.16** $\int_0^{\infty} e^{-x} dx$
 (A) 1 (B) 0
 (C) ∞ (D) none of these [A]

- Q.17** $\int_{-\pi/4}^{\pi/4} \frac{1}{1 + \sin x} dx$
 (A) 1 (B) -1 (C) -2 (D) 2 [D]

- Q.18** $I = \int \frac{(x+a)^3}{x^3} dx$ is equal to -
 (A) $x + 3a \log x - \frac{3a^2}{x} - \frac{a^3}{2x^2} + C$
 (B) $x^2 + 2a \log x - \frac{3a^2}{x} - \frac{a^3}{2x^2} + C$
 (C) $x^3 + 2a \log x + \frac{2a^2}{x} - \frac{3a^3}{2x^2} + C$
 (D) $1 + 2a \log x + \frac{2a^2}{x} - \frac{3a^2}{2x^2} + C$ [A]

- Q.19** $I = \int \frac{1-x^4}{1-x} dx$; then I is equal to -
 (A) $x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + C$
 (B) $\frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \frac{x^4}{5} + C$
 (C) $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + C$
 (D) $\frac{x}{2} - \frac{x^2}{3} + \frac{x^3}{4} - \frac{x^4}{5} + C$ [A]

- Q.20** If $I = \int \frac{(1+x)^3}{\sqrt{x}} dx$; then $I =$
 (A) $2\sqrt{x} + 2x^{3/2} - \frac{6}{5}x^{5/2} - \frac{2}{7}x^{7/2} + C$

- (B) $2\sqrt{x} + 2x^{3/2} + \frac{6}{5}x^{5/2} + \frac{2}{7}x^{7/2} + C$
 (C) $3\sqrt{x} + 3x^{3/2} - \frac{6}{5}x^{6/5} - \frac{2}{7}x^{-7/2} + C$
 (D) $3\sqrt{x} - 3x^{3/2} + \frac{6}{5}x^{6/5} - \frac{2}{7}x^{-7/2} + C$ [B]

- Q.21** $I = \int \frac{1+2\sin x}{\cos^2 x} dx$; then I is equal to -
 (A) $\tan x + \sec x + C$ (B) $\tan x - \sec x + C$
 (C) $\tan x - 2 \sec x + C$ (D) $\tan x + 2 \sec x + C$ [D]

- Q.22** $\frac{d}{dx} \left(\frac{\sin x - x \cos x}{x \sin x + \cos x} \right)$
 (A) $\frac{1}{(x \sin x + \cos x)^2}$ (B) $\frac{\sin x}{(x \sin x + \cos x)^2}$
 (C) $\frac{\cos x}{(x \sin x + \cos x)^2}$ (D) $\frac{x^2}{(x \sin x + \cos x)^2}$ [D]

- Q.23** $xy = y^x$; then $\frac{dy}{dx}$
 (A) $\frac{y}{x} \left(\frac{x \log y - y}{y \log x - x} \right)$ (B) $\frac{x}{y} \left(\frac{x \log y - y}{y \log x - x} \right)$
 (C) $\frac{y}{x} \left(\frac{y \log x - x}{x \log y - y} \right)$ (D) $\frac{x}{y} \left(\frac{y \log x - x}{x \log y - y} \right)$ [A]

- Q.24** $\int \frac{1}{\sin^2 x \cos^2 x} dx$
 (A) $\cot x + \tan x + C$ (B) $\tan x - \cot x + C$
 (C) $-\tan x + \cot x + C$ (D) $-\tan x - \cot x + C$ [B]

- Q.25** $\int \frac{1}{1+e^{-x}} dx$
 (A) $\log |1 + e^x| + C$ (B) $-\log |1 + e^x| + C$
 (C) $\log |1 + e^{-x}| + C$ (D) $-\log |1 + e^x| + C$ [A]

Q.26 $I = \int \frac{x+2}{(x+1)^2} dx$; then I is equal to –

(A) $\log(x+1) + \frac{1}{x+1} + C$

(B) $\log(x+2) - \frac{1}{x+1} + C$

(C) $\log(1+x) - \frac{1}{x+1} + C$

(D) $\log(x+2) + \frac{1}{x+1} + C$ [C]

Q.27 If $I = \int \frac{5\cos^3 x + 2\sin^3 x}{2\sin^2 x \cos^2 x} dx$; then I =

(A) $\frac{5}{2} \operatorname{cosec} x + 3\sec x + C$

(B) $5\operatorname{cosec} x + 3\sec x + C$

(C) $-\frac{5}{2} \operatorname{cosec} x - \sec x + C$

(D) $-\frac{5}{2} \operatorname{cosec} x + \sec x + C$ [D]

Q.28 $y = \int \sqrt{1+\sin 2x} dx$; y is equal to –

(A) $\sin x - \cos x + C$

(B) $\sin x + \cos x + C$

(C) $2 \sin x - \cos x + C$

(D) $2\cos x - \sin x + C$ [A]

Q.29 $I = \int \frac{1-\cos 2x}{1+\cos 2x} dx$; then I is equal to –

(A) $\tan x - x + C$ (B) $\tan x + x + C$

(C) $\tan x \sec x - x + C$ (D) $\tan x \sec x + x + C$

[A]

Q.30 $\frac{d}{dx} \left(1 + \frac{1}{x^2} + \frac{1}{x^3} \right)$

(A) $x + \frac{1}{x^2} + \frac{1}{x^3}$ (B) $\frac{-2}{x^3} - \frac{3}{x^4}$

(C) $x - \frac{1}{x^2} - \frac{3}{x^3}$ (D) $\frac{-2}{x} - \frac{3}{x^2}$ [B]

Q.31 $\int \tan^2 x dx$

(A) $\sec^2 x + x + C$

(B) $\sec x \tan x + C$

(C) $\tan x - x + C$

(D) $2 \tan x \sec^2 x + C$

[C]

Q.32 $\int e^{-x} dx$

(A) $-e^{-x} + C$

(B) $e^{-x} + C$

(C) $-e^x + C$

(D) $e^{-x} + x + C$ [A]

Q.33 $\int \frac{1}{\sin^2 x \cos^2 x} dx$

(A) $\tan x + \cot x + C$

(B) $\tan x - \cot x + C$

(C) $\cot x - \tan x + C$

(D) $-\tan x - \cot x + C$

[B]

Q.34 $\frac{d}{dx} (\sin \sin \sin x)$

(A) $\sin \sin \sin x \cos \sin x \cos x$

(B) $\cos \sin \sin x \cdot \sin \cos x \sin x$

(C) $\sin \cos \sin x \cdot \cos \sin x \cdot \cos x$

(D) $\cos \sin \sin x \cdot \cos \sin x \cdot \cos x$ [D]

Q.35 $\frac{d}{dx} e^{e^{-x}}$

(A) $-e^{e^{-x}} e^{e^x} e^x$

(B) $-e^{e^{-x}} \cdot e^{e^{-x}} \cdot e^{-x}$

(C) $-e^{e^{-x}} e^{e^x} e^{-x}$

(D) $-e^{e^{-x}} e^{e^{-x}} e^x$

[B]

Q.36 $\frac{d}{dx} (\sqrt{\sin \sqrt{x}})$

(A) $\frac{1}{4} \frac{\cos \sqrt{x}}{\sqrt{x} \sin \sqrt{x}}$

(B) $\frac{1}{2} \frac{\cos \sqrt{x}}{\sqrt{\sin \sqrt{x}}}$

(C) $\frac{1}{4} \frac{\cos \sqrt{x}}{\sqrt{\sin \sqrt{x}}}$

(D) $\frac{1}{2} \frac{\cos \sqrt{x}}{\sqrt{x} \sin \sqrt{x}}$ [A]

Q.37 $\frac{d}{dx} \sin^2(x^2)$

(A) $2x \sin^2 x^2 \cos x^2$

(B) $4x \sin x^2 \cos x$

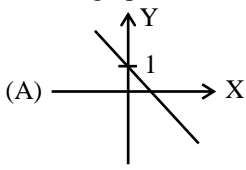
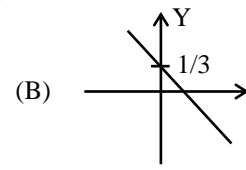
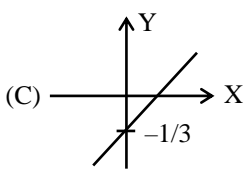
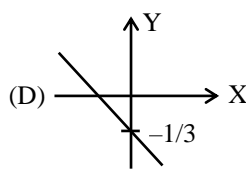
(C) $2x \sin 2x^2$

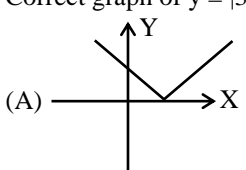
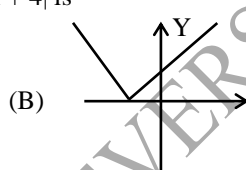
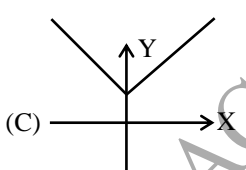
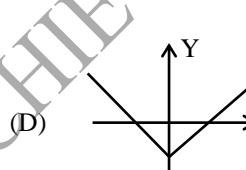
(D) $4x \sin x \cos x^2$

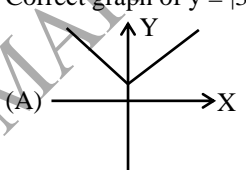
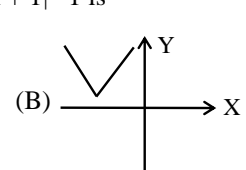
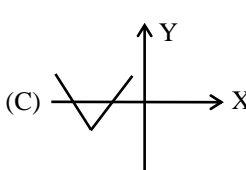
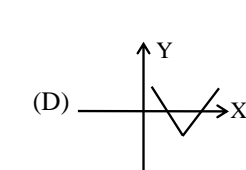
[C]

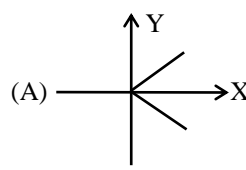
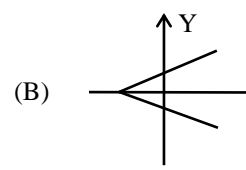
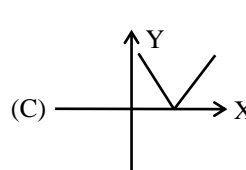
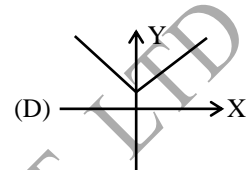
- Q.38** $\int \sqrt{1 + \sin 2x} \, dx$
 (A) $\sin x + \cos x + C$ (B) $\cos x - \sin x + C$
 (C) $\sin x - \cos x + C$ (D) $-\sin x - \cos x + C$ [C]

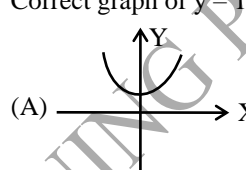
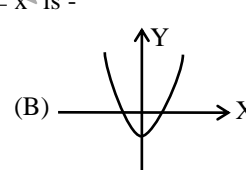
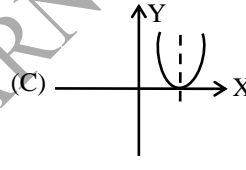
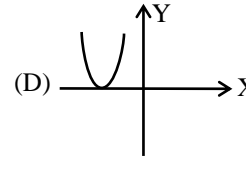
- Q.39** $\int \frac{(\log x)^2}{x} \, dx$
 (A) $\frac{(\log x)^3}{3} + C$ (B) $\log x + C$
 (C) $\frac{(\log x)^2}{2} + C$ (D) $2 \log x + C$ [A]

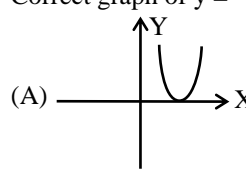
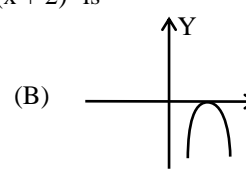
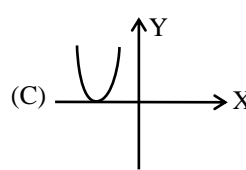
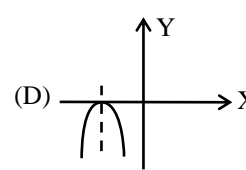
- Q.40** Correct graph of $3x + 4y + 1 = 0$ is -
 (A)  (B) 
 (C)  (D)  [D]

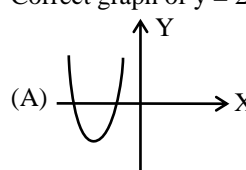
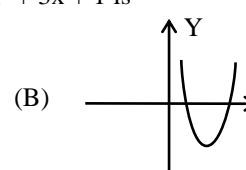
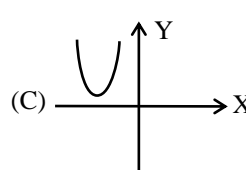
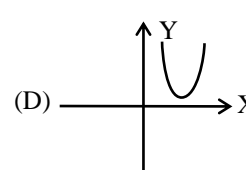
- Q.41** Correct graph of $y = |3x + 4|$ is -
 (A)  (B) 
 (C)  (D)  [B]

- Q.42** Correct graph of $y = |3x + 1| - 1$ is -
 (A)  (B) 
 (C)  (D)  [C]

- Q.43** Correct graph of $|y| = x + 1$ is -
 (A)  (B) 
 (C)  (D)  [B]

- Q.44** Correct graph of $y - 1 = x^2$ is -
 (A)  (B) 
 (C)  (D)  [A]

- Q.45** Correct graph of $y = -(x + 2)^2$ is -
 (A)  (B) 
 (C)  (D)  [D]

- Q.46** Correct graph of $y = 2x^2 + 3x + 1$ is -
 (A)  (B) 
 (C)  (D)  [A]

Q.47 $y = \sec x + \tan x$, value of $\frac{dy}{dx}$ is -
 (A) $\sec^2 x + \tan x$ (B) $\tan^2 x + \sec x$
 (C) $\sec x (\tan x + \sec x)$ (D) $\sec x (1 + \sec x)$
 [C]

Q.48 $y = \cos^2 x$ is given, then $\frac{dy}{dx}$ is -
 (A) $-2 \sin x \cos x$ (B) $2 \sin x \cos x$
 (C) $\sin^2 x$ (D) none of these [A]

Q.49 If $y = \tan[\log(x^2)]$, then $\frac{dy}{dx}$ is -
 (A) $2x \sec^2[\log(x^2)]$ (B) $\frac{2\sec^2[\log(x^2)]}{x}$
 (C) $x \sec^2[\log(x^2)]$ (D) $\frac{1}{x^2} \sec^2 [\log(x^2)]$
 [B]

Q.50 If $y = x^3 \tan(\log x)$, then $\frac{dy}{dx}$ is -
 (A) $3x^2 \tan(\log x) + x^3 \sec^2(\log x)$
 (B) $3x^2 \tan(\log x) + x^2 \sec^2(\log x)$
 (C) $x^2[\tan(\log x) + \sec^2(\log x)]$
 (D) $3x \sec^2(\log x)$ [B]