



## Fsc part 02

### Important Short Questions for Chapter 02

- Q.No.1.** Differentiate from first principle if  $y=x^m$
- Q.No.2.** Differentiate from first principle if  $y=x^{\frac{3}{2}}$
- Q.No.3.** Find derivative of  $Y=(2\sqrt{x} + 2)(x - \sqrt{x})$  w.r.t  $x$
- Q.No.4.** Differentiate  $x^{-3} + 2x^{\frac{-3}{2}} + 3$  w.r.t  $x$
- Q.No.5.** Differentiate  $\frac{a+x}{a-x}$  w.r.t  $x$
- Q.No.6.** Differentiate  $(\sqrt{x} - \frac{1}{\sqrt{x}})^2$  w.r.t  $x$
- Q.No.7.** If  $y=\sqrt{x} - \frac{1}{\sqrt{x}}$ , show that  $2x\frac{dy}{dx} + y = 2\sqrt{x}$
- Q.No.8.** If  $y = x^4 + 2x^2 + 2$ , Prove that  $\frac{dy}{dx} = 4x\sqrt{y-1}$
- Q.No.9.** Find  $\frac{dy}{dx}$  if  $x = at^2$  and  $y = 2at$
- Q.No.10.** Find  $\frac{dy}{dx}$  if  $x^2 + y^2 = 4$
- Q.No.11.** Find  $\frac{dy}{dx}$  if  $y^2 + x^2 - 4x = 5$
- Q.No.12.** Find  $\frac{dy}{dx}$  if  $y^2 - xy - x^2 + 4 = 0$
- Q.No.13.** Find  $\frac{dy}{dx}$  by making suitable substitution, if  $y = \sqrt{x + \sqrt{x}}$
- Q.No.14.** Find  $\frac{dy}{dx}$  by making suitable substitution, if  $y = (3x^2 - 2x + 7)^6$
- Q.No.15.** Find  $\frac{dy}{dx}$  if  $3x + 4y + 7 = 0$
- Q.No.16.** Find  $\frac{dy}{dx}$  if  $xy + y^2 = 2$
- Q.No.17.** Find  $\frac{dy}{dx}$  if  $x^2 - 4xy - 5y = 0$
- Q.No.18.** Find  $\frac{dy}{dx}$  if  $x = \theta + \frac{1}{\theta}$  and  $y = \theta + 1$
- Q.No.19.** Differentiate  $(1 + x^2)^n$  w.r.t  $x^2$
- Q.No.20.** If  $y=\tan(2\tan^{-1}\frac{x}{2})$ , show that  $\frac{dy}{dx} = \frac{4(1+y^2)}{4+x^2}$
- Q.No.21.** Differentiate  $x^2 \sec 4x$  w.r.t involved variable
- Q.No.22.** Differentiate  $\tan^3 \theta \sec^2 \theta$  w.r.t involved variable
- Q.No.23.** Find  $\frac{dy}{dx}$  if  $y = x \cos x$
- Q.No.24.** Find  $\frac{dy}{dx}$  if  $x=y \sin y$
- Q.No.25.** Differentiate  $\sin x$  w.r.t  $\cos x$
- Q.No.26.** If  $\tan y(1+\tan x)=1-\tan x$ , show that  $\frac{dy}{dx} = 1$
- Q.No.27.** If  $y = \sqrt{\tan x + \sqrt{\tan x + \sqrt{\tan x + \dots}}}$  Prove that  $(2y-1)\frac{dy}{dx} = \sec^2 x$
- Q.No.28.** Differentiate  $\cot^{-1} \frac{x}{a}$  w.r.t  $x$
- Q.No.29.** Differentiate  $\frac{1}{a} \sin^{-\frac{a}{x}}$  w.r.t  $x$
- Q.No.30.** If  $y=\tan(p \tan^{-1} x)$ , Show that  $(1 + x^2)y^{1-p}(1 + y^2) = 0$
- Q.No.31.** Differentiate  $y=a^x$  w.r.t  $x$
- Q.No.32.** Differentiate  $(\ln x)^x$  w.r.t  $x$
- Q.No.33.** Find  $f'(x)$  if  $f(x)=x^3 e^{\frac{1}{x}}$



**Q.No.34.** Find  $f'(x)$  if  $f(x)=e^x(1 + \ln x)$

**Q.No.35.** Find  $f'(x)$  if  $f(x)=\ln(e^x + e^{-x})$

**Q.No.36.** Find  $f'(x)$  if  $f(x)=\ln\sqrt{e^{2x} + e^{-2x}}$

**Q.No.37.** Find  $\frac{dy}{dx}$  if  $y=x\sqrt{\ln x}$

**Q.No.38.** Find  $\frac{dy}{dx}$  if  $y=\frac{x}{\ln x}$

**Q.No.39.** Find  $\frac{dy}{dx}$  if  $y = \ln(9 - x^2)$

**Q.No.40.** Find  $\frac{dy}{dx}$  if  $y = e^{-2x}\sin 2x$

**Q.No.41.** Find  $\frac{dy}{dx}$  if  $y = xe^{\sin x}$

**Q.No.42.** Find  $\frac{dy}{dx}$  if  $y = 5e^{3x-4}$

**Q.No.43.** Find  $\frac{dy}{dx}$  if  $y=(x + 1)^x$

**Q.No.44.** Find  $\frac{dy}{dx}$  if  $y = \tanh^{-1}(\sin x)$

**Q.No.45.** Find  $y_2$  if  $y=\sqrt{x} + \frac{1}{\sqrt{x}}$

**Q.No.46.** Find  $y_2$  if  $x^2 + y^2 = a^2$

**Q.No.47.** Find  $y_2$  if  $x=at^2, y = bt^4$

**Q.No.48.** Apply Maclaurin series to prove  $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$

**Q.No.49.** Define increasing and decreasing function

**Q.No.50.** Define Point of inflection

**Q.No.51.** Define Stationary point and critical point

**Q.No.52.** Find extreme value for  $f(x)=1 - x^2$

**Q.No.53.** Find Extreme value for  $f(x)=3x^2$

**Q.No.54.** Find extreme value for  $f(x) = 5 + 3x - x^3$

**Q.No.55.** Find extreme value for  $f(x)=x^2 - x - 2$