

**EXERCISE – III****SUBJECTIVE QUESTIONS****PART – A****1. Integrate with respect to x**

(i)  $\sin 2x + \frac{1}{x+1}$

(ii)  $\tan(3x + 1) + e^{4x+5}$

(iii)  $2 \tan(4x + 5)$

(iv)  $\frac{x}{\sqrt{x+2}}$

(v)  $\sin^2 x$

(vi)  $\cos^2 x$

(vii)  $\sin 2x \cos 3x$

(viii)  $\left(e^x + \frac{1}{e^x}\right)^2$

(ix)  $(e^x + 1)^2 e^x$

(x)  $\frac{1}{\sqrt{x+3} - \sqrt{x+2}}$

**PART – B****2. Integrate with respect to x**

(i)  $x \sin x^2$

(ii)  $\frac{x}{x^2+1}$

(iii)  $\sec^2 \tan x$

(iv)  $\frac{e^x+1}{e^x+x}$

(v)  $\frac{1 - \sin x}{x + \cos x}$

(vi)  $\frac{e^{2x}}{e^{2x}-2}$

(vii)  $\frac{\cos 2x + x + 1}{x^2 + \sin 2x + 2x}$

(viii)  $\frac{\sec x}{\log(\sec x + \tan x)}$

(ix)  $x^5 \sqrt{a^3 + x^3}$

**PART – C****3. Integrate with respect to x**

(i)  $x \sin x$

(ii)  $x \ln x$

(iii)  $x \sin^2 x$

(iv)  $x \tan^{-1} x$

(v)  $\ln x$

(vi)  $\sec^3 x$

(vii)  $2x^3 e^{x^2}$

(viii)  $\sin^{-1} \sqrt{x}$

(ix)  $\frac{x^2 \tan^{-1} x}{1+x^2}$

(x)  $e^x \sin x$

(xi)  $e^x (\sec^2 x + \tan x)$

**PART – D****4. Integrate with respect to x**

(i)  $\sqrt{x^2+4}$

(ii)  $\frac{1}{x^2+4}$

(iii)  $\frac{1}{\sqrt{x^2-4}}$

(iv)  $\frac{1}{x^2 + 5}$

(v)  $\sqrt{x^2 + 2x + 5}$

(vi)  $\frac{1}{x^2 + 2x + 5}$

(vii)  $(x - 1)\sqrt{1 - x - x^2}$

(viii)  $\frac{2x + 1}{x^2 + 3x + 4}$

(ix)  $\frac{1}{x(x^5 + 1)}$

(x)  $\frac{1}{x^5(1 + x^5)^{\frac{1}{5}}}$

(xi)  $\int \frac{\sqrt{x^2 - 8}}{x^4} dx$

(xii)  $\frac{x^3 - 1}{x^3 + x}$

#### PART - E

#### 5. Integrate with respect to x

(i)  $\frac{1}{2 + \cos x}$

(ii)  $\frac{1}{2 - \cos x}$

(iii)  $\frac{2\sin x + 2\cos x}{3\cos x + 2\sin x}$

(iv)  $\frac{1}{1 + \sin x + \cos x}$

(v)  $\frac{dx}{2 + \sin^2 x}$

(vi)  $\frac{\cos \sec^2 x \cdot \sin x}{(\sin x - \cos x)}$

(vii)  $\frac{\sin^4 x}{\cos^2 x}$

#### PART - F

#### 6. Integrate with respect to x

(i)  $\frac{1}{x^4 + x^2 + 1}$

(ii)  $\frac{1 + x^2}{1 + x^4}$

(iii)  $\frac{1 - x^2}{1 - x^2 + x^4}$

#### PART - G

#### 7. Integrate with respect to x

(i)  $\frac{1}{(x + 1)\sqrt{x + 2}}$

(ii)  $\frac{1}{(x^2 - 4)\sqrt{x + 1}}$

(iii)  $\frac{1}{(x + 1)\sqrt{x^2 + 2}}$

(iv)  $\frac{1}{(x^2 + 1)\sqrt{x^2 + 2}}$

#### PART - H

#### 8. Integrate with respect to x

(i)  $\frac{1}{(x + 1)(x + 2)}$

(ii)  $\frac{1}{(x^2 + 1)(x + 3)}$

(iii)  $\frac{1}{(x + 1)^2(x + 2)}$

$$(iv) \frac{1}{(x+1)(x+2)(x+3)}$$

$$9. \int \sin^2 x \cos^2 x \, dx$$

$$10. \int \frac{1}{\sin(x-a)\cos(x-b)} \, dx$$

$$11. \int \frac{x + \sqrt{x+1}}{x+2} \, dx$$

$$12. \int \frac{(x-1)^2}{x^4 + x^2 + 1} \, dx$$

$$13. \int \frac{x \ln x}{(x^2 - 1)^{3/2}} \, dx$$

$$14. \int \frac{2 \sin 2\phi - \cos \phi}{6 - \cos^2 \phi - 4 \sin \phi} \, d\phi$$

$$15. \int \frac{1}{1 - \sin^4 x} \, dx$$

$$16. \int \frac{\sqrt{4+x^2}}{x^6} \, dx$$

$$17. \int \frac{1 + x \cos x}{x(1 - x^2 e^{2 \sin x})} \, dx$$

$$18. \int \cos 2x \ln(1 + \tan x) \, dx$$

$$19. \int \frac{1 + \cos \alpha \cos x}{\cos \alpha + \cos x} \, dx$$

$$20. \int \cos x \cdot e^x x^2 \, dx$$

$$21. \int \frac{dx}{(x^3 + 3x^2 + 3x + 1)\sqrt{x^2 + 3x - 3}}$$

$$22. \int e^x \frac{x^3 - x + 2}{(x^2 + 1)^2} \, dx$$

$$23. \int \frac{(\cos 2x - 3)}{\cos^4 x \sqrt{4 - \cot^2 x}} \, dx$$

$$24. \int \sin 4x \cdot e^{\tan^2 x} \, dx$$

$$25. \int \tan^{-1} x \cdot \ln(1 + x^2) \, dx$$

$$26. \int e^x \frac{1 + nx^{n-1} - x^{2n}}{(1 - x^n)\sqrt{1 - x^{2n}}} \, dx$$

$$27. \int \frac{a + b \sin x}{(b + a \sin x)^2} \, dx$$

$$28. \int \frac{x \cos \alpha + 1}{(x^2 + 2x \cos \alpha + 1)^{3/2}} \, dx = \frac{f(x)}{\sqrt{g(x)}} + c$$

then find  $f(x)$  and  $g(x)$

$$29. \text{Evaluate } \int \frac{\ln(1 + \sin^2 x)}{\cos^2 x} \, dx$$