EXERCISE – IV | ADVANCED SUBJECTIVE QUESTIONS

1. $\int \dfrac{\tan 2\theta}{\sqrt{\cos^6 \theta + \sin^6 \theta}} d\theta$

2. $\int \dfrac{5x^4 + 4x^5}{(x^5 + x + 1)^2} dx$

3. $\int \dfrac{\cos^2 x}{1 + \tan x} dx$

4. Integrate $\int \dfrac{dx}{x\sqrt{x^2 + 2x - 1}}$ by the substitution

$z = x + \sqrt{x^2 + 2x - 1}$

5. $\int \left[\left(\dfrac{x}{e}\right)^x + \left(\dfrac{e}{x}\right)^x \right] \ell n\, x\, dx$

6. $\int \dfrac{a^2 \sin^2 x + b^2 \cos^2 x}{a^4 \sin^2 x + b^4 \cos^2 x} dx$

7. $\int \dfrac{dx}{\left(x + \sqrt{x^2 - 1}\right)^2}$

8. $\int \sqrt{\dfrac{\sin(x - a)}{\sin(x + a)}} dx$

9. $\int \dfrac{\cot x\, dx}{(1 - \sin x)(\sec x + 1)}$

10. $\int \sin^{-1} \sqrt{\dfrac{x}{a + x}} dx$

11. $\int \left[\dfrac{\sqrt{x^2 + 1}\left[\ell n\,(x^2 + 1) - 2\ell n\, x \right]}{x^4} \right] dx$

12. $\int \dfrac{x + 1}{x(1 + xe^x)^2} dx$

13. Let f(x) is a quadratic function such that f(0) = 1 and $\int \dfrac{f(x)\, dx}{x^2 (x + 1)^3}$ is a rational function, find the value of f '(0).

14. Integrate $\dfrac{1}{2}$ f '(x) w.r.t. x^4 ,

where f(x) = $\tan^{-1} x + \ell n\, \sqrt{1 + x} - \ell n\, \sqrt{1 - x}$

15. $\int \dfrac{(\sqrt{x} + 1)\, dx}{\sqrt{x}\, (\sqrt[3]{x} + 1)}$

16. $\int \dfrac{dx}{\sin \dfrac{x}{2} \sqrt{\cos^3 \dfrac{x}{2}}}$

17. $\int \dfrac{x^2 + x}{(e^x + x + 1)^2} dx$

18. $\int \sqrt{\dfrac{\cos ecx - \cot x}{\cos ecx + \cot x}} \cdot \dfrac{\sec x}{\sqrt{1 + 2\sec x}} dx$

19. $\int \dfrac{\cos x - \sin x}{7 - 9\sin 2x} dx$

20. $\int \dfrac{dx}{\sec x + \cos ec\, x}$

21. $\int \dfrac{dx}{\sin x + \sec x}$

22. $\int \tan x . \tan 2x . \tan 3x\, dx$

23. $\int \dfrac{3 + 4\sin x + 2\cos x}{3 + 2\sin x + \cos x} dx$

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24. $\int \dfrac{e^{\cos x}(x\sin^3 x + \cos x)}{\sin^2 x}\, dx$

25. $\int \dfrac{(ax^2 - b)dx}{x\sqrt{c^2 x^2 - (ax^2 + b)^2}}$

26. $\int \dfrac{e^x(2 - x^2)}{(1-x)\sqrt{1-x^2}}\, dx$

27. $\int \dfrac{x\,\ell n\, x}{(x^2 - 1)^{3/2}}\, dx$

28. $\int \sqrt{\dfrac{(1-\sin x)(2-\sin x)}{(1+\sin x)(2+\sin x)}}\, dx$

29. $\int \dfrac{4x^5 - 7x^4 + 8x^3 - 2x^2 + 4x - 7}{x^2(x^2 + 1)^2}\, dx$

30. $\int \dfrac{\sqrt{2-x-x^2}}{x^2}\, dx$

31. $\int \dfrac{dx}{(x-\alpha)\sqrt{(x-\alpha)(x-\beta)}}$

32. $\int \dfrac{dx}{\cos^3 x - \sin^3 x}$

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