

7. Evaluate  $\int (1-x)\sqrt{x} dx$ .

8. Given,  $\int e^x (\tan x + 1) \sec x dx = e^x f(x) + C$ .  
Write  $f(x)$  satisfying above.

9. Evaluate  $\int \frac{2}{1 + \cos 2x} dx$ .

10. Write the value of  $\int \frac{x + \cos 6x}{3x^2 + \sin 6x} dx$ .

11. Write the value of  $\int \frac{\sec^2 x}{\operatorname{cosec}^2 x} dx$ .

12. Write the value of  $\int \frac{dx}{x^2 + 16}$ .

13. Write the value of  $\int \frac{2 - 3 \sin x}{\cos^2 x} dx$ .

14. Write the value of  $\int \sec x (\sec x + \tan x) dx$ .

15. Evaluate  $\int \frac{dx}{\sqrt{1-x^2}}$ .

16. Evaluate  $\int \frac{(\log x)^2}{x} dx$ .

17. Evaluate  $\int \frac{e^{\tan^{-1} x}}{1+x^2} dx$ .

18. Evaluate  $\int (ax+b)^3 dx$ .

19. Evaluate  $\int \frac{(1 + \log x)^2}{x} dx$ .

20. Evaluate  $\int \frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}} dx$ .

21. Evaluate  $\int \frac{\cos \sqrt{x}}{\sqrt{x}} dx$ .

22. Evaluate  $\int \frac{2 \cos x}{3 \sin^2 x} dx$ .

23. Evaluate  $\int \frac{x^3 - x^2 + x - 1}{x - 1} dx$ .

**1 Mark Questions**

1. Find  $\int \frac{\sin^2 x - \cos^2 x}{\sin x \cos x} dx$ .

2. Find  $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx$ .

3. Find  $\int \frac{\sin^6 x}{\cos^8 x} dx$ .

4. Evaluate  $\int \frac{dx}{\sin^2 x \cos^2 x}$ .

5. Evaluate  $\int \cos^{-1}(\sin x) dx$ .

6. Write the anti-derivative of  $\left(3\sqrt{x} + \frac{1}{\sqrt{x}}\right)$ .

24. Write the value of  $\int \frac{1 - \sin x}{\cos^2 x} dx$ .

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25. Evaluate  $\int \frac{2 \cos x}{\sin^2 x} dx$ .

26. Evaluate  $\int \frac{x^3 - 1}{x^2} dx$ .

27. Evaluate  $\int \sec^2(7 - 4x) dx$ .

28. Evaluate  $\int \frac{\log x}{x} dx$ .

29. Evaluate  $\int 2^x dx$ .

### 2 Marks Questions

30. Find :  $\int \frac{\sec^2 x}{\sqrt{\tan^2 x + 4}} dx$ .

31. Find :  $\int \sqrt{1 - \sin 2x} dx, \frac{\pi}{4} < x < \frac{\pi}{2}$ .

32. Find :  $\int \sin^{-1}(2x) dx$ .

33. Find the values of  $\int \frac{\tan^2 x \cdot \sec^2 x}{1 - \tan^6 x} dx$ .

34. Find the value of  $\int \sin x \cdot \log \cos x dx$ .

35. Find  $\int \sqrt{3 - 2x - x^2} dx$ .

36. Find  $\int \frac{\sin^3 x + \cos^3 x}{\sin^2 x \cos^2 x} dx$ .

37. Find  $\int \frac{x - 3}{(x - 1)^3} e^x dx$ .

38. Find  $\int \frac{x - 5}{(x - 3)^3} e^x dx$ .

39. Evaluate  $\int \frac{\cos 2x + 2 \sin^2 x}{\cos^2 x} dx$ .

40. Find :  $\int \frac{3 - 5 \sin x}{\cos^2 x} dx$ .

41. Find  $\int \frac{dx}{x^2 + 4x + 8}$ .

42. Find  $\int \frac{dx}{5 - 8x - x^2}$ .

### 4 Marks Questions

43. Find :  $\int \frac{3x + 5}{x^2 + 3x - 18} dx$ .

44. Find the value of  $\int \frac{\cos x}{(1 + \sin x)(2 + \sin x)} dx$ .

45. Find  $\int \frac{x^2 + x + 1}{(x + 2)(x^2 + 1)} dx$ .

46. Find  $\int \frac{2 \cos x}{(1 - \sin x)(2 - \cos^2 x)} dx$ .

47. Find  $\int \frac{2 \cos x}{(1 - \sin x)(1 + \sin^2 x)} dx$ .

48. Find  $\int \frac{4}{(x - 2)(x^2 + 4)} dx$ .

49. Find  $\int \frac{2x}{(x^2 + 1)(x^2 + 2)^2} dx$ .

50. Find  $\int \frac{2x}{(x^2 + 1)(x^4 + 4)} dx$ .

51. Find  $\int \frac{\cos \theta}{(4 + \sin^2 \theta)(5 + 4 \cos^2 \theta)} d\theta$ .

52. Find  $\int \frac{(3 \sin \theta - 2) \cos \theta}{5 - \cos^2 \theta - 4 \sin \theta} d\theta$ .

Or,

Find  $\int \frac{(3 \sin x - 2) \cos x}{5 - \cos^2 x - 4 \sin x} dx$ .

53. Find  $\int \frac{\sqrt{x}}{\sqrt{a^3 - x^3}} dx$ .

54. Find  $\int (x + 3)\sqrt{(3 - 4x - x^2)} dx$ .

55. Evaluate  $\int \frac{x^2 + x + 1}{(x^2 + 1)(x + 2)} dx$ .
56. Find  $\int \frac{(2x - 5)e^{2x}}{(2x - 3)^3} dx$ .
57. Find  $\int (2x + 5)\sqrt{10 - 4x - 3x^2} dx$ .
58. Find  $\int \frac{(x^2 + 1)(x^2 + 4)}{(x^2 + 3)(x^2 - 5)} dx$ .
59. Evaluate  $\int \frac{x \sin^{-1} x}{\sqrt{1 - x^2}} dx$ .
60. Find  $\int \frac{dx}{\sin x + \sin 2x}$ .
61. Integrate w.r.t.  $x$ ,  $\frac{x^2 - 3x + 1}{\sqrt{1 - x^2}}$ .
62. Evaluate  $\int (3 - 2x)\sqrt{2 + x - x^2} dx$ .
63. Find  $\int \frac{\log |x|}{(x + 1)^2} dx$ .
64. Evaluate  $\int \frac{\sin(x - a)}{\sin(x + a)} dx$ .
65.  $\int e^{2x} \cdot \sin(3x + 1) dx$ .
66. Evaluate  $\int \frac{x^2}{(x^2 + 4)(x^2 + 9)} dx$ .
67. Find  $\int \frac{(x^2 + 1)e^x}{(x + 1)^2} dx$ .
68. Evaluate  $\int (x - 3)\sqrt{x^2 + 3x - 18} dx$ .
69. Evaluate  $\int \frac{x + 2}{\sqrt{x^2 + 5x + 6}} dx$ .
70. Evaluate  $\int (3x - 2)\sqrt{x^2 + x + 1} dx$ .
71. Find  $\int \frac{5x - 2}{1 + 2x + 3x^2} dx$ .
72. Find  $\int \frac{x^3}{x^4 + 3x^2 + 2} dx$ .
73. Evaluate  $\int \frac{x \cos^{-1} x}{\sqrt{1 - x^2}} dx$ .
74. Evaluate  $\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} dx$ .
75. Evaluate  $\int e^{2x} \left( \frac{1 - \sin 2x}{1 - \cos 2x} \right) dx$ .
76. Evaluate  $\int \frac{3x + 1}{(x + 1)^2(x + 3)} dx$ .
77. Evaluate  $\int \frac{2x^2 + 1}{x^2(x^2 + 4)} dx$ .
78. Evaluate  $\int \frac{x^2 + 1}{(x^2 + 4)(x^2 + 25)} dx$ .
79. Evaluate  $\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$ .
80. Evaluate  $\int \frac{x + 2}{\sqrt{x^2 + 2x + 3}} dx$ .
81. Evaluate  $\int \frac{dx}{x(x^5 + 3)}$ .
82. Evaluate  $\int \frac{dx}{x(x^3 + 1)}$ .
83. Evaluate  $\int \frac{dx}{x(x^3 + 8)}$ .
84. Evaluate  $\int \frac{\sqrt{1 - \sin x}}{1 + \cos x} e^{\frac{-x}{2}} dx$ .
85. Evaluate  $\int \frac{3x + 5}{x^3 - x^2 - x + 1} dx$ .
86. Evaluate  $\int \sin x \cdot \sin 2x \cdot \sin 3x dx$ .
87. Evaluate  $\int \frac{2}{(1 - x)(1 + x^2)} dx$ .
88. Evaluate  $\int \left( \frac{1 + \sin x}{1 + \cos x} \right) e^x dx$ .
89. Evaluate  $\int \frac{x^2}{(x \sin x + \cos x)^2} dx$ .

90. Evaluate  $\int e^{2x} \sin x \, dx$ .

91. Evaluate  $\int \frac{3x+5}{\sqrt{x^2-8x+7}} \, dx$ .

92. Evaluate  $\int \frac{x^2+4}{x^4+16} \, dx$ .

93. Evaluate  $\int \frac{x^2+1}{x^4+1} \, dx$ .

94. Evaluate  $\int \frac{\sin x - \cos x}{\sqrt{\sin 2x}} \, dx$ .

95. Evaluate  $\int \frac{2x}{(x^2+1)(x^2+3)} \, dx$ .

96. Evaluate  $\int \frac{5x+3}{\sqrt{x^2+4x+10}} \, dx$ .

97. Evaluate  $\int e^{2x} \left( \frac{1+\sin 2x}{1+\cos 2x} \right) dx$ .

98. Evaluate  $\int \frac{dx}{(x^2+1)(x^2+2)}$ .

99. Evaluate  $\int \left[ \log(\log x) + \frac{1}{(\log x)^2} \right] dx$ .

100. Evaluate  $\int \frac{x+2}{\sqrt{(x-2)(x-3)}} \, dx$ .

101. Evaluate  $\int \frac{1-x^2}{x(1-2x)} \, dx$ .

102. Evaluate  $\int e^x \left( \frac{\sin 4x - 4}{1 - \cos 4x} \right) dx$ .

### 6 Marks Questions

103. Evaluate

$$\int \frac{1}{\sin^4 x + \sin^2 x \cos^2 x + \cos^4 x} \, dx$$

104. Evaluate  $\int (\sqrt{\cot x} + \sqrt{\tan x}) \, dx$ .

105. Evaluate  $\int \frac{1}{\cos^4 x + \sin^4 x} \, dx$ .

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

107. Find  $\int \frac{\sin^{-1} \sqrt{x} - \cos^{-1} \sqrt{x}}{\sin^{-1} \sqrt{x} + \cos^{-1} \sqrt{x}} \, dx, x \in [0, 1]$ .

108. Find  $\int \frac{x^2+x+1}{(x+1)^2(x+2)} \, dx$ .

109. Find  $\int \frac{\sqrt{x^2+1}(\log|x^2+1| - 2\log|x|)}{x^4} \, dx$ .

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

111. Evaluate  $\int \frac{6x+7}{\sqrt{(x-5)(x-4)}} \, dx$ .

answers are on next Page

## Answers

$$1) \log |\sec x \cdot \operatorname{cosec} x| + C$$

$$2) \tan x + \cot x + C$$

$$3) \frac{\tan^7 x}{7} + C$$

$$4) \tan x - \cot x + C$$

$$5) \frac{\pi}{2} x - \frac{x^2}{2} + C$$

$$6) 2(x^{3/2} + x^{1/2}) + C$$

$$7) \frac{2}{3} x^{3/2} - \frac{2}{5} x^{5/2} + C$$

$$8) e^x \cdot \sec x + C$$

$$9) \tan x + C$$

$$10) \frac{1}{6} [\log(3x^2 + \sin 6x)] + C$$

$$11) \tan x - x + C$$

$$12) \frac{1}{4} \tan^{-1} \frac{x}{4} + C$$

$$13) 2 \tan x - 3 \sec x + C$$

$$14) \tan x + \sec x + C$$

$$15) \sin^{-1} x + C$$

$$16) \frac{(\log x)^3}{3} + C$$

$$17) e^{\tan^{-1} x} + C$$

$$18) \frac{(ax+b)^4}{4} + C$$

$$19) \frac{(1 + \log x)^3}{3} + C$$

$$20) \frac{1}{2} \log [e^{2x} + e^{-2x}] + C$$

$$21) 2 \sin \sqrt{x} + C$$

$$22) \frac{-2}{3 \sin x} + C$$

$$23) \frac{x^3}{3} + x + C$$

$$24) \tan x - \sec x + C$$

$$25) -2 \operatorname{cosec} x + C$$

$$26) \frac{x^2}{2} + \frac{1}{x} + C$$

$$27) \frac{-\tan(7-4x)}{4} + C$$

$$28) \frac{(\log x)^2}{2} + C$$

$$29) \frac{2^x}{\log 2} + C$$

$$30) \log [\tan x + \sqrt{\tan^2 x + 4}] + C$$

$$31) -(\cos x + \sin x) + C$$

$$32) \frac{1}{2} [2x \sin^{-1} 2x + \sqrt{1-4x^2}] + C$$

$$33) \frac{1}{6} \log \left| \frac{1 + \tan^3 x}{1 - \tan^3 x} \right| + C$$

$$34) -\cos x \cdot \log \cos x + \cos x + C$$

$$35) \frac{1}{2} \left[ (x+1) \sqrt{3-2x-x^2} + 4 \sin^{-1} \left( \frac{x+1}{2} \right) \right] + C$$

$$36) 2x - \operatorname{cosec} x + C$$

$$37) \frac{e^x}{(x-1)^2} + C$$

$$38) \frac{e^x}{(x-3)^2} + C$$

$$39) \tan x + C$$

$$40) 3 \tan x - 5 \operatorname{cosec} x + C$$

$$41) \frac{1}{a} \tan^{-1} \frac{x}{a} + C$$

$$42) \frac{1}{2a} \log \left| \frac{a+x}{a-x} \right| + C$$

$$43) \frac{3}{2} \log |x^2 + 3x - 18| + \frac{1}{18} \log \left| \frac{x-3}{x+6} \right| + C$$

$$44) \log \left| \frac{1 + \sin x}{2 + \sin x} \right| + C$$

$$45) \frac{3}{5} \log |x+2| + \frac{1}{5} \log |x^2+1| + \frac{1}{5} \tan^{-1} x + C$$

$$46) \tan^{-1}(\sin x) + \log \left| \frac{\sqrt{1 + \sin^2 x}}{1 - \sin x} \right| + C$$

$$47) \tan^{-1}(\sin x) + \log \left| \frac{\sqrt{1 + \sin^2 x}}{1 - \sin x} \right| + C$$

$$48) \frac{1}{2} \log|x-2| - \frac{1}{2} \log|x^2+4| + \frac{1}{2} \tan^{-1}\left(\frac{x}{2}\right) + C$$

$$49) \log|x^2+1| - \log|x^2+2| + \frac{1}{x^2+2} + C$$

$$50) \frac{1}{5} \log|x^2+1| - \frac{1}{5} \left[ \frac{1}{2} \log(x^2+4) - \frac{1}{2} \tan^{-1}\left(\frac{x^2}{2}\right) \right] + C$$

$$51) \frac{-1}{30} \tan^{-1}\left(\frac{\sin\theta}{2}\right) + \frac{2}{15} + \tan^{-1}(2\sin\theta) + C$$

$$52) 3 \log|\sin\theta-2| - \frac{4}{(\sin\theta-2)} + C$$

$$53) \frac{2}{3} \sin^{-1}\left(\sqrt{\frac{x^3}{4^3}}\right) + C$$

$$54) \frac{-1}{3} (3-4x-x^2)^{3/2} + \frac{1}{2} (x+2) \sqrt{3-4x-x^2} + \frac{7}{2} \sin^{-1}\left(\frac{x+2}{\sqrt{7}}\right) + C$$

$$55) \frac{3}{5} \log|x+2| + \frac{1}{5} \log|x^2+1| + \frac{1}{5} \tan^{-1}x + C$$

$$56) \frac{e^{2x} (2x-3)^{-2}}{2} + C$$

$$57) = \frac{-2}{3} (10-4x-3x^2)^{3/2} + \frac{11\sqrt{3}}{6} \left[ \left(x+\frac{2}{3}\right) \sqrt{\frac{34}{9} - \left(x+\frac{2}{3}\right)^2} + \frac{34}{9} \sin^{-1}\left(\frac{3x+2}{\sqrt{34}}\right) \right] + C$$

$$58) x + \frac{1}{4\sqrt{3}} \tan^{-1}\left(\frac{x}{\sqrt{3}}\right) + \frac{27}{8\sqrt{5}} \log\left|\frac{x-\sqrt{5}}{x+\sqrt{5}}\right| + C$$

$$59) -\sin^{-1}x \sqrt{1-x^2} + x + C$$

$$60) \frac{1}{6} \log|1-\cos x| + \frac{1}{2} \log|1+\cos x| - \frac{2}{3} \log|1+2\cos x| + C$$

$$61) 3 \sin^{-1}x - \frac{x}{2} \sqrt{1-x^2} + 3 \sqrt{1-x^2} + C$$

$$62) \frac{2}{3} (2+x-x^2)^{3/2} + \frac{2x-1}{2} \sqrt{2+x-x^2} + \frac{9}{4} \sin^{-1}\left(\frac{2x-1}{3}\right) + C$$

$$63) \frac{-\log |x|}{x+1} + \log \left| \frac{x}{x+1} \right| + C$$

$$64) x(\cos 2a - \sin 2a) \log |\sin(x+a)| + C$$

$$65) \frac{2e^{2x} \sin(3x+1)}{13} - \frac{3e^{2x} \cos(3x+1)}{13} + C$$

$$66) \frac{3}{5} + \arcsin\left(\frac{x}{3}\right) - \frac{2}{5} + \arcsin\left(\frac{x}{2}\right) + C$$

$$67) e^x \left( \frac{x-1}{x+1} \right) + C$$

$$68) \frac{1}{3} (x^2 + 3x - 18)^{3/2} - \frac{9}{8} (2x+3) \sqrt{x^2 + 3x - 18} \\ + \frac{729}{16} \log \left| \frac{2x+3}{2} + \sqrt{x^2 + 3x - 18} \right| + C$$

$$69) \sqrt{x^2 + 5x + 6} - \frac{1}{2} \log \left| x + \frac{5}{2} + \sqrt{x^2 + 5x + 6} \right| + C$$

$$70) (x^2 + x + 1)^{3/2} - \frac{7}{8} (2x+1) \sqrt{x^2 + x + 1} - \frac{21}{16} \log \left| \frac{x+1}{2} + \sqrt{x^2 + x + 1} \right| + C$$

$$71) \frac{5}{6} \log |1 + 2x + 3x^2| - \frac{11}{3\sqrt{2}} \arcsin\left(\frac{3x+1}{\sqrt{2}}\right) + C$$

$$72) \log \left| \frac{x^2 + 2}{\sqrt{x^2 + 1}} \right| + C$$

$$73) -\sqrt{1-x^2} \cos^{-1} x - x + C$$

$$74) \tan x - \cot x - 3x + C$$

$$75) -\frac{e^{2x}}{2} (\cot x + C)$$

$$76) 2 \log \left| \frac{x+1}{x+3} \right| + \frac{1}{(x+1)} + C$$



$$77) -\frac{1}{4x} + \frac{7}{8} \tan^{-1}\left(\frac{x}{2}\right) + C$$

$$78) -\frac{1}{14} \tan^{-1}\left(\frac{x}{2}\right) + \frac{8}{35} \tan^{-1}\left(\frac{x}{5}\right) + C$$

$$79) 2(\sin x + x \cos x) + C$$

$$80) \sqrt{x^2 + 2x + 3} + \log \left| (x+1) + \sqrt{x^2 + 2x + 3} \right| + C$$

$$81) \frac{1}{15} \log \left| \frac{x^5}{x^5 + 3} \right| + C$$

$$82) \frac{1}{3} \log \left| \frac{x^3}{x^3 + 1} \right| + C$$

$$83) \frac{1}{8} \log \left| \frac{x}{(x^3 + 8)^{1/3}} \right| + C$$

$$84) -e^{-x/2} \sec x/2 + C$$

$$85) \frac{1}{2} \log \left| \frac{x+1}{x-1} \right| - \frac{4}{x-1} + C$$

$$86) -\frac{\cos 2x}{8} + \frac{\cos 6x}{24} - \frac{\cos 4x}{16} + C$$

$$87) -\log |1-x| + \frac{1}{2} \log |1+x^2| + \tan^{-1} x + C$$

$$88) e^x \tan x/2 + C$$

$$89) \frac{-x \sec x}{x \sin x + \cos x} + \tan x + C$$

$$90) \frac{1}{5} e^{2x} (2 \sin x - \cos x) + C$$

$$91) 3 \sqrt{x^2 - 8x + 7} + 17 \log \left| (x-4) + \sqrt{(x-4)^2 + 9} \right| + C$$

$$92) \frac{1}{2\sqrt{2}} \tan^{-1} \left( \frac{x^2 - 4}{2\sqrt{2}x} \right) + C$$

$$93) \frac{1}{\sqrt{2}} \tan^{-1} \left( \frac{x^2 - 1}{x\sqrt{2}} \right) + C$$

$$94) -\log | (\sin x + \cos x) + \sqrt{\sin 2x} | + C$$

$$95) \frac{1}{2} \log \left| \frac{1+x^2}{3+x^2} \right| + C$$

$$96) 5 \sqrt{x^2+4x+10} - 7 \log | x+2 + \sqrt{x^2+4x+10} | + C$$

$$97) \frac{1}{2} e^{2x} \tan x + C$$

$$98) \tan^{-1} x - \frac{1}{\sqrt{2}} \tan^{-1} \left( \frac{x}{\sqrt{2}} \right) + C$$

$$99) x \log(\log x) - \frac{x}{\log x} + C$$

$$100) \sqrt{x^2-5x+6} + \frac{9}{2} \log \left| (x-5/2) + \sqrt{(x-2)(x-3)} \right| + C$$

$$101) \frac{1}{2} x + \log |x| - \frac{3}{4} \log |1-2x| + C$$

$$102) e^x \cot 2x + C$$

$$103) \frac{1}{\sqrt{3}} \tan^{-1} \left( \frac{\tan^2 x - 1}{\sqrt{3} \tan x} \right) + C$$

$$104) \sqrt{2} \tan^{-1} \left( \frac{\tan x - 1}{\sqrt{2} + \tan x} \right) + C$$

$$105) \frac{1}{\sqrt{2}} \tan^{-1} \left( \frac{\tan^2 x - 1}{\sqrt{2} + \tan x} \right) + C$$

$$106) -\frac{1}{3} \tan^{-1} x + \frac{2}{3} \tan^{-1} \left( \frac{x}{2} \right) + C$$

$$107) \frac{2}{x} \left[ (2x-1) \sin^{-1} \sqrt{x} + \sqrt{x-x^2} \right] - x + C$$

$$108) -2 \log |x+1| - \frac{1}{x+1} + 3 \log |x+2| + C$$

$$109) -\frac{1}{3} \left( 1 + \frac{1}{x^2} \right)^{3/2} \left[ \log \left| 1 + \frac{1}{x^2} \right| - \frac{2}{3} \right] + C$$

$$110) \frac{3}{8} \log|x-1| - \frac{1}{2(x-1)} + \frac{5}{8} \log|x+3| + C$$

$$111) 6 \sqrt{x^2 - 9x + 20} + 34 \log \left| x - \frac{9}{2} + \sqrt{\left(x - \frac{9}{2}\right)^2 - \frac{1}{4}} \right| + C$$