



Name :

Time : 6 hr

Total Marks = 191

Date: 23/10/2017

Q1. Evaluate $\int \frac{x^3 - x^2 + x - 1}{x - 1} dx$ 1

Q2. Evaluate $\int \sin(e^x) d(e^x)$ 1

Q3. Evaluate $\int \sqrt{\frac{1 - \cos 2x}{1 + \cos 2x}} dx$ 1

Q4. Evaluate $\int \frac{2 \cos x}{\sin^2 x} dx$ 1

Q5. Evaluate $\int \frac{\cos 2x}{\sin^2 x \cos^2 x} dx$ 1

Q6. Evaluate $\int \sin^{-1} \cos x dx$ 1

Q7. Evaluate $\int \frac{\sin^3 x - \cos^3 x}{\sin^2 x \cos^2 x} dx$ 1

Q8. Evaluate $\int \sin^{-1} \left(\frac{2 \tan x}{1 + \tan^2 x} \right) dx$ 1

Q9. Evaluate $\int \tan^{-1} \left(\frac{\sin 2x}{1 + \cos 2x} \right) dx$ 1

Q10. Evaluate $\int \frac{\cos 2x + 2 \sin^2 x}{\cos^2 x} dx$ 1

Q11. Evaluate $\int \frac{\sin 4x}{\cos 2x} dx$ 1

Q12. Evaluate $\int \frac{1 + \cos 4x}{\cot x - \tan x} dx$ 1

Q13. Evaluate $\int \cos^3 x dx$ 1

Q14. Evaluate $\int \sin 4x \cos 3x dx$ 1

Q15. Evaluate $\int \cos 4x \cos 2x dx$ 1

Q16. Evaluate $\int \frac{\sin 4x}{\sin x} dx$ 1

Q17. Form the differential equation from the following primitives where constants are arbitrary : $y = cx + 2c^2 + c^3$ 1

Q18. Write the degree of the following differential equation 1

$$x^3 \left(\frac{d^2 y}{dx^2} \right)^2 + \left(\frac{dy}{dx} \right)^4 = 0 .$$

Q19. Determine the order and degree of the following differential equation. 1

$$\frac{d^5 y}{dx^5} + e^{\frac{dy}{dx}} + y^2 = 0.$$

Q20. Determine the order and degree of the following differential equation. 1

$$\frac{d^4 y}{dx^4} + \sin\left(\frac{d^3 y}{dx^3}\right) = 0.$$

Q21. Determine the order and degree of the following differential equation. 1

$$y = \frac{dy}{dx} + \frac{c}{\frac{dy}{dx}}$$

Q22. Determine the order and degree of the following differential equation. 1

$$y + \frac{dy}{dx} = \frac{1}{4} \int y dx$$

Q23. Determine the order and degree of the following differential equation. 1

$$\frac{\left\{1 + \left(\frac{dy}{dx}\right)^2\right\}^{\frac{3}{2}}}{\frac{d^2 y}{dx^2}} = K$$

Q24. Determine the order and degree of the following differential equation. 1

$$\frac{d^2 y}{dx^2} = 1 + \sqrt{\frac{dy}{dx}}$$

Q25. Evaluate 1

$$\int_0^{\frac{\pi}{2}} \sqrt{\sin x} \cos x dx.$$

Q26. Evaluate $\int \frac{dx}{\sqrt{x}(1+\sqrt{x})}$. 1

Q27. Evaluate $\int \sec^2(7-4x) dx$ 1

Q28. Compute the Integral : $\int 2x \sin(x^2 + 1) dx$ 1

Q29. Evaluate $\int \frac{(1 + \log x)^2}{x} dx$ 1

Q30. Evaluate $\int \frac{e^{\tan^{-1} x}}{1+x^2} dx$ 1

Q31. Evaluate $\int \frac{x}{e^{x^2}} dx$ 1

Q32. Evaluate $\int \sec^4 x \tan x dx$. 1

Q33. Evaluate $\int \frac{1 + \cot x}{x + \log \sin x} dx$ 1

Q34. Evaluate $\int \frac{\sec x \tan x}{3 \sec x + 5} dx$ 1

- Q35. Evaluate $\int \frac{1 - \sin x}{x + \cos x} dx$ 1
- Q36. Evaluate $\int \frac{1 + \tan x}{x + \log \sec x} dx$ 1
- Q37. Evaluate $\int \frac{dx}{\sqrt{1-x^2}(2+3\sin^{-1}x)}$ 1
- Q38. Evaluate $\int e^{-x} \operatorname{cosec}^2(2e^{-x} + 5) dx$ 1
- Q39. Evaluate $\int \sqrt{\tan x} (1 + \tan^2 x) dx$ 1
- Q40. Evaluate $\int \frac{(1 + \sqrt{x})^2}{\sqrt{x}} dx$ 1
- Q41. Evaluate $\int \frac{1 + \cos x}{(x + \sin x)^3} dx$ 1
- Q42. Evaluate $\int x^3 \sin(x^4 + 1) dx$ 1
- Q43. Evaluate $\int \frac{e^{\sqrt{x}} \cos e^{\sqrt{x}}}{\sqrt{x}} dx$ 1
- Q44. Evaluate $\int \frac{x \tan^{-1}(x^2)}{1+x^4} dx$ 1
- Q45. Evaluate $\int e^{\cos^2 x} \sin 2x dx$ 1
- Q46. Evaluate $\int \frac{\sec^2 \sqrt{x}}{\sqrt{x}} dx$ 1
- Q47. Evaluate $\int \frac{\sqrt{\tan x}}{\sin x \cos x} dx$ 1
- Q48. Evaluate $\int x^2 e^{x^3} \cos(2e^{x^3}) dx$ 1
- Q49. Evaluate $\int \frac{(x+1)(x+\log x)^2}{x} dx$ 1
- Q50. Evaluate $\int \log x \frac{\sin[1+(\log x)^2]}{x} dx$ 1
- Q51. Evaluate $\int_2^3 \frac{x}{x^2+1} dx.$ 1
- Q52. Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{1+\cos^2 x} dx.$ 1
- Q53. Evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos x dx.$ 1

Q54. Evaluate	1
$\int_{-\pi/4}^{\pi/4} \sin^3 x \, dx$	
Q55. Evaluate	1
$\int \frac{1}{\sqrt{1+4x^2}} \, dx$	
Q56. Evaluate	1
$\int_2^3 \frac{1}{x} \, dx$	
Q57. Evaluate	1
$\int_0^{\pi/4} (2 \sec^2 x + x^3 + 2) \, dx.$	
Q58. Evaluate	1
$\int_0^{1/\sqrt{2}} \frac{1}{\sqrt{1-x^2}} \, dx$	
Q59. Evaluate	1
$\int \frac{1}{\sqrt{9-25x^2}} \, dx$	
Q60. Evaluate	1
$\int \frac{dx}{\sqrt{16x^2+25}}$	
Q61. Determine the order and degree of the following differential equation.	1
$\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{dy}{dx}\right) = 0.$	
Q62. Evaluate	1
$\int_0^1 x-5 \, dx.$	
Q63. Evaluate	1
$\int \frac{dx}{16-9x^2}$	
Q64. Evaluate	1
$\int \sqrt{4+x^2} \, dx$	
Q65. Form the differential equation from the following primitives where constants are arbitrary : $xy = a^2$	1
Q66. Evaluate	1
$\int \frac{dx}{4+9x^2}$	
Q67. Evaluate	1
$\int_{-1}^1 \frac{dx}{x^2+2x+5}.$	
Q68. Evaluate	1
$\int_0^{\pi/6} (1-\cos 3\theta) \sin 3\theta \, d\theta.$	

Q69. Evaluate

1

$$\int_0^{\frac{\pi}{4}} \tan x \, dx$$

Q70. Evaluate $\int (x^3 - 1)^{1/3} x^5 \, dx$

2

Q71. Evaluate $\int \frac{\sin 2x}{a^2 \sin^2 x + b^2 \cos^2 x} \, dx$

2

Q72. Evaluate $\int \tan^{-1} \sqrt{\frac{1 - \cos 2x}{1 + \cos 2x}} \, dx$

2

Q73. Evaluate $\int \tan^3 x \sec^3 x \, dx$

2

Q74. Evaluate $\int (x^4 + x^2 + 1) d(x^2)$

2

Q75. Evaluate $\int \frac{1}{\sqrt{9 + 8x - x^2}} \, dx$

2

Q76. Evaluate $\int \frac{2 \sin x \cos x}{\sin^4 x + \cos^4 x} \, dx$

2

Q77. Evaluate $\int \frac{dx}{\cos x (\sin x + 2 \cos x)}$

2

Q78. Evaluate $\int \left[\frac{1}{\log x} - \frac{1}{(\log x)^2} \right] dx$

2

Q79. Evaluate $\int e^x \frac{x-1}{(x+1)^3} \, dx$

2

Q80. Evaluate $\int \frac{1}{x^2} \cos^2 \left(\frac{1}{x} \right) dx$

2

Q81. Evaluate $\int \frac{1}{\sqrt{\sin^3 x \cos x}} \, dx$

2

Q82. Evaluate $\int 5^{(x + \tan^{-1} x)} \left(\frac{x^2 + 2}{x^2 + 1} \right) dx$

2

Q83. Evaluate $\int e^x (\cot x + \log \sin x) \, dx$

2

Q84. Evaluate $\int e^x \left(\frac{1}{x^2} - \frac{2}{x^3} \right) dx$

2

Q85. Evaluate $\int \frac{x^2 + x + 1}{(x-1)^3} \, dx$

2

Q86. Evaluate $\int \frac{x+1}{x(x+\log x)} \, dx$

2

Q87. Evaluate $\int \sqrt{7x - 10 - x^2} \, dx$

2

Q88. Evaluate $\int x \sqrt{x^4 + 1} \, dx$

2

Q89. Evaluate $\int \sqrt{2x^2 + 3x + 4} \, dx$

2

Q90. Evaluate $\int \frac{\tan x \sec^2 x}{(a + b \tan^2 x)^2} dx$ 2

Q91. Evaluate $\int \frac{\sec x}{\log(\sec x + \tan x)} dx$ 2

Q92. Evaluate $\int \frac{1}{\sqrt{7 - 6x - x^2}} dx$ 2

Q93. Evaluate $\int \frac{\cos 4x - \cos 2x}{\sin 4x - \sin 2x} dx$ 2

Q94. Evaluate $\int \frac{1}{x(\log x)^m} dx, m > 0$ 2

Q95. Evaluate 2

$$\int_{-1}^1 e^{|x|} dx$$

Q96. Evaluate 2

$$\int_0^{\pi} |\cos x| dx$$

Q97. Evaluate 2

$$\int_1^2 e^{2x} \left(\frac{1}{x} - \frac{1}{2x^2} \right) dx$$

Q98. Prove that 2

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin^2 x dx = \frac{\pi}{4} - \frac{1}{2}.$$

Q99. Evaluate 2

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (5 \sin^3 x + 8 \sin x + 4 \cos^2 x) dx.$$

Q100 Prove that 2

$$\int_0^{\frac{\pi}{2}} \sin^2 x dx = \frac{\pi}{4}.$$

Q101 Evaluate 2

$$\int_0^1 x(1-x)^5 dx$$

Q102 Evaluate 2

$$\int_0^{\frac{\pi}{4}} \sin^3 2t \cos 2t dt.$$

Q103 Evaluate

2

$$\int_4^9 \frac{\sqrt{x}}{(30-x^2)^2} dx.$$

Q104 Evaluate

2

$$\int_3^4 \frac{dx}{\sqrt{x^2+4}}.$$

Q105 If $\int_0^k \frac{dx}{2+8x^2} = \frac{\pi}{16}$, find the value of k .

2

Q106 Evaluate

2

$$\int_0^1 \left(xe^x + \cos \frac{\pi x}{4} \right) dx.$$

Q107 Evaluate $\int \sec x \log(\sec x + \tan x) dx$

2

Q108 Evaluate $\int e^x (\tan x + \log \sec x) dx$ or $\int e^x (\tan x - \log \cos x) dx$

2

Q109 Evaluate $\int e^x \left(\tan^{-1} x + \frac{1}{1+x^2} \right) dx$

2

Q110 Evaluate $\int \frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}} dx$

2

Q111 Evaluate $\int e^x \left(\frac{\sin x \cos x - 1}{\sin^2 x} \right) dx$

2

Q112 Evaluate $\int \frac{\sec x}{\sec x + \tan x} dx$

2

Q113. Evaluate $\int \frac{x^4 + x^2 + 1}{x^2 - x + 1} dx$

2

Q114 Evaluate $\int \frac{1}{\sin^2 x \cos^2 x} dx.$

2

Q115 Evaluate $\int \frac{\sin x}{1 + \sin x} dx$

2

Q116 If $f'(x) = 8x^3 - 2x$, $f(2) = 8$, find $f(x)$

2

Q117 If $f'(x) = a \sin x + b \cos x$ and $f(0) = 4$, $f(0) = 3$, $f\left(\frac{\pi}{2}\right) = 5$ find $f(x)$.

2

Q118 Evaluate $\int \frac{1}{3x^2 + 13x - 10} dx$

2

Q119 Evaluate $\int \frac{1}{x^2 + 6x + 13} dx$

2

Q120 Evaluate $\int \frac{dx}{\sqrt{x+2} - \sqrt{x+3}}$

2

Q121 Evaluate $\int \frac{\cos x}{\sin^2 x + 4 \sin x + 5} dx$

2

Q122 Evaluate $\int \frac{x^{e-1} + e^{x-1}}{x^e + e^x} dx.$

2

- Q123 Evaluate $\int \frac{\sin^4 x}{\cos^8 x} dx$ 2
- Q124 Form the differential equation from the following primitives where constants are arbitrary : $y^2 = 4ax$ 2
- Q125 Form the differential equation from the following primitives where constants are arbitrary : $e^x + ce^y = 1$ 2
- Q126 Form the differential equation from the following primitives where constants are arbitrary : $y = ax^2 + bx + c$ 2
- Q127 Form the differential equation representing the family of curves $y = A \cos(x + B)$, where A and B are parameters. 2
- Q128 Form the differential equation of family of parabolas having vertex at the origin and axis along positive y -axis. 2
- Q129 In a bank principal increases at the rate of $r\%$ per year. Find the value of r if Rs. 100 double itself in 10 years ($\log_e 2 = 0.6931$). 2
- Q130 In a bank principal increases at the rate of 5% per year. An amount of Rs. 1000 is deposited with this bank, how much will it worth after 10 years ($e^{0.5} = 1.648$). 2

