

Answer Ex-I**SINGLE CORRECT (OBJECTIVE QUESTIONS)**

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|-------|-------|-------|-------|-------|-------|-------|
| 1. D | 2. B | 3. C | 4. C | 5. D | 6. B | 7. B |
| 8. A | 9. C | 10. A | 11. B | 12. A | 13. D | 14. A |
| 15. B | 16. A | 17. C | 18. B | 19. A | 20. B | 21. D |
| 22. B | 23. C | 24. B | | | | |

Answer Ex-II**MULTIPLE CORRECT (OBJECTIVE QUESTIONS)**

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|----------|--------|--------|-------------|-------|---------|---------|
| 1. A,B,C | 2. C,D | 3. A,B | 4. A,B,D | 5. C | 6. B | 7. A |
| 8. D | 9. A | 10. A | 11. C,D | 12. A | 13. A,D | 14. C,D |
| 15. C | 16. D | 17. A | 18. A,B,C,D | | | |

Answer Ex-III**SUBJECTIVE QUESTIONS**

- (i) order 2 & degree 3 (ii) order 2 & degree 2
- $\ell n^2 (\sec x + \tan x) - \ell n^2 (\sec y + \tan y) = c$ 3. $\sqrt{x^2 - 1} - \sec^{-1} x + \sqrt{y^2 - 1} = c$
- $\ell n \left[1 + \tan \frac{x+y}{2} \right] = x + c$ 5. (a) $\ell n \left| \tan \frac{y}{4} \right| = c - 2 \sin \frac{x}{2}$, (b) $y = e^{\tan(x/2)}$
- $y = (x+1) \cdot \ell n(x+1) - x + 3$
- (a) $P = 1000 + 1500 e^{-kt}$ where $k = \frac{1}{10} \ell n \left(\frac{5}{3} \right)$; (b) $T = 10 \log_{5/3}(3)$; (c) $P = 1000$ as $t \rightarrow \infty$
- $m = m_0 e^{-kt}$ where $k = -\frac{1}{t_0} \ell n \left(1 - \frac{\alpha}{100} \right)$ 9. $x^2 + y^2 = k^2$ 10. $y = \frac{1}{k} \ell n |c(k^2 x^2 - 1)|$
- $y = x^{1/n}$ 12. $y = kx$ or $xy = c$
- (a) $c(x-y)^{2/3} (x^2 + xy + y^2)^{1/6} = \exp \left[\frac{1}{\sqrt{3}} \tan^{-1} \frac{x+2y}{x\sqrt{3}} \right]$ where $\exp x \equiv e^x$
(b) $y^2 - x^2 = c (y^2 + x^2)^2$
- $\frac{y^2 \pm y\sqrt{y^2 - x^2}}{x^2} = \ell n \left| \left(y \pm \sqrt{y^2 - x^2} \right) \cdot \frac{c^2}{x^3} \right|$, where same sign has to be taken
- $x^2 + y^2 - 2x = 0$ 18. $\frac{1}{2} \ell n |x^2 + a^2| - \tan^{-1} \left(\frac{a}{x} \right) = c$, where $a = x + y^2$ 19. $xy \cos \frac{y}{x} = c$
- $x^2 + y^2 = cx$ 21. $\arctan \frac{2y+1}{2x+1} = \ln c \sqrt{x^2 + y^2 + x + y + \frac{1}{2}}$ 22. $x + y + \frac{4}{3} = ce^{3(x-2y)}$
- $\frac{1}{2}$ 25. $y = c(1-x^2) + \sqrt{1-x^2}$ 26. $y = cx^2 \pm x$
- $y = cx - x^2$ 28. $y = cx + x \ell n \tan x$ 29. $x = ce^{-\arctan y} + \arctan y - 1$
- $y = cx \pm \frac{a^2}{2x}$ 32. $\cos x - 1$ 33. $f(x) = -\frac{2 \cos x}{(1 + \sin x)^2} - Ce^{-\sin x} \cdot \cos x$

34. $27\frac{7}{9}$ minutes 35. $\frac{dy}{dt} = 4 - \frac{y}{200+t}$ 36. $y^2 + x \ln ax = 0$
37. $\sin y = (e^x + c)(1 + x)$ 38. $cx^2 + 2xe^{-y} = 1$ 39. $y = ce^x; y = c + \frac{x^2}{2}$
40. $y^2 = -1 + (x+1) \ln \frac{c}{x+1}$ or $x + (x+1) \ln \frac{c}{x+1}$ 41. $e^y = c \cdot \exp(-e^x) + e^x - 1$
42. $y^2 = \frac{2}{3} \sin x + \frac{c}{\sin^2 x}$

Answer Ex-IV**ADVANCED SUBJECTIVE QUESTIONS**

1. $y = 2^{\sin x}$ 2. $y = \frac{1}{3-e}(2e^x - e + 1)$ 3. $f(x) = e^{2x}$
4. (i) $y = u(x) + K(u(x) - v(x))$ where K is any constant; (ii) $\alpha + \beta = 1$; (iii) constant
5. $y = \pm \left[\sqrt{4-x^2} + 2 \ln \frac{2-\sqrt{4-x^2}}{x} \right]$ 6. $xy + \tan^{-1} \frac{y}{x} = c$ 7. $\frac{\sin^{-1} x}{2} + \frac{y}{x-y} = \frac{\pi}{4} - 2$
8. $y^2 = 2x + 1 - e^{2x}$ 9. $f(x) = e^x - \cos x$ 10. $y = \frac{x}{\sqrt{1-x^2}} = ce^{-\frac{x}{\sqrt{1-x^2}}}$
11. $x(x^2 y^2 + \cos xy) = c$ 12. $x(ey + \ln y + 1) = 1$ 13. $y^2 = cx$
14. $y = \pm a \frac{e^{x/a} + e^{-x/a}}{2}$ & $y = \pm a$ 15. $x = e^{2\sqrt{y/x}}; x = e^{-2\sqrt{y/x}}$
16. $T = \log_{4/3} 2$ hrs from the start 17. $y = 5t \left(1 + \frac{50}{50+t} \right)$ gms; $91\frac{2}{3}$ gms
19. $2y + Kx^3 = cx$
20. (i) $x^2 + 2y^2 = c$, (ii) $\sin y = ce^{-x}$, (iii) $y = cx$ if $k = 2$ and $\frac{1}{x^{k-2}} - \frac{1}{y^{k-2}} = \frac{1}{c^{k-2}}$ if $k \neq 2$
(iv) $x^2 - y^2 + 2xy = c$; $x^2 - y^2 - 2xy = c$

Answer Ex-V**JEE PROBLEMS**

1. (a) C, (b) A, C, (c) $x^2 + y^2 - 2x = 0$
2. $y = \ln((x+2y)^2 + 4(x+2y) + 2) - \frac{3}{2\sqrt{2}} \ln \left(\frac{x+2y+2-\sqrt{2}}{x+2y+2+\sqrt{2}} \right) + c$
4. $\frac{7\pi \times 10^5}{135\sqrt{g}}$ sec. 5. $y = (x - 2\tan^{-1} x)(1 + x^2)$ 7. (a) $T = H/k$
8. (a) C; (b) $y = x^2 - 2x$, area = $4/3$ sq. units
9. (a) C; (b) A; (c) $\sqrt{1-y^2} + \ln \left| \frac{1-\sqrt{1-y^2}}{y} \right| = \pm x + c$
10. B, C 11. (a) A, (b) C 12. C