

DIFFERENTIAL EQUATION

1. The integrating factor of the differential equation $(x \log x) \frac{dy}{dx} + y = 2 \log x$, is given by
(a) $\log(\log x)$ (b) e^x (c) $\log x$ (d) x
2. The general solution of the differential equation $\frac{dy}{dx} = \frac{y}{x}$ is
(a) $\log y = kx$ (b) $y = kx$ (c) $xy = k$ (d) $y = k \log x$
3. Integrating factor of the differential equation $\cos x \frac{dy}{dx} + y \sin x = 1$, is
(a) $\sin x$ (b) $\sec x$ (c) $\tan x$ (d) $\cos x$
4. The degree of the differential equation $(\frac{d^2y}{dx^2})^2 - (\frac{dy}{dx})^3 = y^3$, is
(a) $1/2$ (b) 2 (c) 3 (d) 4
5. The degree of the differential equation $\{5 + (\frac{dy}{dx})^2\}^{(5/3)} = x^5 (\frac{d^2y}{dx^2})$, is
(a) 4 (b) 2 (c) 3 (d) 10
6. The general solution of the differential equation $\frac{dy}{dx} + y \cot x = \operatorname{cosec} x$, is
(a) $x + y \sin x = C$ (b) $x + y \cos x = C$
(c) $y + x (\sin x + \cos x) = C$ (d) $y \sin x = x + C$
7. The differential equation obtained on eliminating A and B from $y = A \cos \omega t + B \sin \omega t$ is
(a) $y'' + y' = 0$ (b) $y'' - \omega^2 y = 0$
(c) $y'' = -\omega^2 y$ (d) $y'' + y = 0$
8. The equation of the curve whose slope is given by $\frac{dy}{dx} = \frac{2y}{x}$; $x > 0$, $y > 0$ and which passes through the point (1, 1) is
(a) $x^2 = y$ (b) $y^2 = x$ (c) $x^2 = 2y$ (d) $y^2 = 2x$
9. The order of the differential equation whose general solution is given by $y = c_1 \cos(2x + c_2) - (c_3 + c_4) a^x + c_5 + c_6 \sin(x - c_7)$ is
(a) 3 (b) 4 (c) 5 (d) 2

10. The solution of the differential equation $dy/dx = (ax + g)/(by+f)$ represents a circle when
 (a) $a = b$ (b) $a = -b$ (c) $a = -2b$ (d) $a = 2b$
11. The solution of the differential equation $dy/dx + 2y/x = 0$ with $y(1) = 1$ is given by
 (a) $y = 1/x^2$ (b) $x = 1/y^2$ (c) $x = 1/y$ (d) $y = 1/x$
12. The solution of the differential equation $dy/dx = y(x+1)/x = 0$ is given By
 (a) $y = xe^{x+C}$ (b) $x = ye^x$ (c) $y = x + C$ (d) $xy = e^x + C$
13. The order of the differential equation satisfying $\sqrt{(1-x^4)} + \sqrt{(1-y^4)} = a(x^2-y^2)$ is
 (a) 1 (b) 2 (c) 3 (d) 4
14. The solution of the differential equation $y_1 y_3 = y_2^2$ is
 (a) $x = C_1 e^{C_2 y} + C_3$ (b) $y = C_1 e^{C_2 x} + C_3$
 (c) $2x = C_1 e^{C_2 y} + C_3$ (d) none of these
15. The general solution of the differential equation $dy/dx + yg'(x) = g(x) g'(x)$, where $g(x)$ is a given function of x , is
 (a) $g(x) + \log(1 + y + g(x)) = C$
 (b) $g(x) + \log(1 + y - g(x)) = C$
 (c) $g(x) - \log(1 + y - g(x)) = C$
 (d) none of these
16. The solution of the differential equation $dy/dx = 1 + x + y^2 + xy^2, y(0) = 0$ is
 (a) $y^2 = \exp(x + x^2/2) - 1$
 (b) $y^2 = 1 + C \exp(x + x^2/2)$
 (c) $y = \tan(C + x + x^2)$
 (d) $y = \tan(x + x^2/2)$
17. The differential equation of the ellipse $x^2/a^2 + y^2/b^2 = C$ is
 (a) $y''/y + y'/y - 1/x = 0$
 (b) $y''/y + y'/y + 1/x = 0$
 (c) $y''/y - y'/y - 1/x = 0$
 (d) none of these

18. Solution of the differential equation $dy/dx + y/x = \sin x$ is
 (a) $x(y + \cos x) = \sin x + C$
 (b) $x(y - \cos x) = \sin x + C$
 (c) $x(y + \cos x) = \cos x + C$
 (d) none of these
19. The equation of the curve satisfying the differential equation $y(x + y^3) dx = x(y^3 - x) dy$ and passing through the point (1, 1) is
 (a) $y^3 - 2x + 3x^2y = 0$
 (b) $y^3 + 2x + 3x^2y = 0$
 (c) $y^3 + 2x - 3x^2y = 0$
 (d) none of these
20. The solution of the differential equation $2x dy/dx - y = 3$ represents
 (a) circles (b) straight lines
 (c) ellipses (d) parabolas
21. The solution of the differential equation $x dy/dx = y + x \tan y/x$, is
 (a) $\sin y/x = x + C$ (b) $\sin y/x = Cx$
 (c) $\sin y/x = Cy$ (d) $\sin y/x = Cy$
22. The differential equation satisfied by $ax^2 + by^2 = 1$ is
 (a) $xyy_2 + y_1^2 + yy_1 = 0$
 (b) $xyy_2 + xy_1^2 - yy_1 = 0$
23. The differential equation which represents the family of curves $y = e^{Cx}$ is
 (a) $y_1 = C^2y$ (b) $xy_1 - \ln y = 0$
 (c) $x \ln y = yy_1$ (d) $y \ln y = xy_1$
24. Which of the following transformations reduce the differential equation
 $dz / dx + (z/x) \log z = (z/x) (\log z)^2$ into the form
 $du/dx + P(x) u = Q(x)$
 (a) $u = \log x$ (b) $u = e^2$
 (c) $u = (\log z)^{-1}$ (d) $u = (\log z)^2$
25. The solution of the differential equation $dy/dx = y/x + \varphi(y/x)$ is
 (a) $\varphi(y/x) = kx$ (b) $x \varphi(y/x) = k$
 (c) $\varphi(y/x) = ky$ (d) $y \varphi(y/x) = k$
26. If m and n are the order and degree of the differential equation
 $(y_2)^5 + 4(y_2)^3 / y_3 = x^3$, then
 (a) $m = 3, n = 3$ (b) $m = 3, n = 2$

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(CHAPTER NOTES)

[CLASS XII]

- (c) $m = 3, n = 5$ (d) $m = 3, n = 1$
27. The solution of the differential equation $dy/dx + 1 = e^{(x+y)}$, is
(a) $(x + y) e^{(x+y)} = 0$ (b) $(x + C) e^{(x+y)} = 0$
(c) $(x - C) e^{(x+y)} = 1$ (d) $(x - C) e^{(x+y)} + 1 = 0$
28. The solution of $x^2 + y^2 dy/dx = 4$, is
(a) $x^2 + y^2 = 12x + C$ (b) $x^2 + y^2 = 3x + C$
(c) $x^3 + y^3 = 3x + C$ (d) $x^3 + y^3 = 12x + C$
29. The family of curves in which the subtangent at any point of a curve is double the abscissa is given by
(a) $x = Cy^2$ (b) $y = Cx^2$ (c) $x^2 = Cy^2$ (d) $y = Cx$
30. The solution of the differential equation $x dx + y dy = x^2 y dy - y^2 x dx$, is
(a) $x^2 - 1 = C(1 + y^2)$ (b) $x^2 + 1 = C(1 - y^2)$
(c) $x^3 - 1 = C(1 + y^3)$ (d) $x^3 + 1 = C(1 - y^3)$
31. The solution of the differential equation $(x^2 + 1) dy/dx + (y^2 + 1) = 0$, is
(a) $y = 2 + x^2$ (b) $y = (1+x) / (1-x)$
(c) $y = x(x-1)$ (d) $y = (1-x) / (1+x)$
32. The differential equation $x dy/dx - y = x^2$, has the general solution
(a) $y - x^3 = 2cx$ (b) $2y - x^3 = cx$
(c) $2y + x^2 = 2cx$ (d) $y + x^2 = 2cx$
33. The solution of the differential equation $dy / dx - ky = 0, y(0) = 1$ approaches to zero when $x \rightarrow \infty$, if
(a) $k = 0$ (b) $k > 0$ (c) $k < 0$ (d) none of these
34. The solution of the differential equation $(1 + x^2) dy / dx + 1 + y^2 = 0$, is
(a) $\tan^{-1} x - \tan^{-1} y = \tan^{-1} C$
(b) $\tan^{-1} y - \tan^{-1} x = \tan^{-1} C$
(c) $\tan^{-1} y \pm \tan^{-1} x = \tan C$
(d) $\tan^{-1} y + \tan^{-1} x = \tan^{-1} C$
35. The solution of the differential equation $dy / dx = (x^2 + xy + y^2) / x^2$, is
(a) $\tan^{-1} (x / y) = \log y + C$
(b) $\tan^{-1} (y / x) = \log x + C$
(c) $\tan^{-1} (x / y) = \log x + C$
(d) $\tan^{-1} (y / x) = \log y + C$

36. The differential equation $dy / dx + Py = Qy^n, n > 2$ can be reduced to linear form by substituting
- (a) $z = y^{(n-1)}$ (b) $z = y^n$
(c) $z = y^{(n+1)}$ (d) $z = y^{(1-n)}$
37. If p and q are the order and degree of the differential equation $dy / dx + x^3 d^2 y / dx^2 + xy = \cos x$, then
- (a) $p < q$ (b) $p = q$ (c) $p > q$ (d) none of these
38. Which of the following is the integrating factor of $(x \log x) dy / dx + y = 2 \log x$?
- (a) x (b) e^x (c) $\log x$ (d) $\log (\log x)$
39. What is integrating factor of $dy / dx + y \sec x = \tan x$?
- (a) $\sec x + \tan x$ (b) $\log (\sec x + \tan x)$
(c) $e^{\sec x}$ (d) $\sec x$
40. Integrating factor of the differential equation $\cos x dy / dx + y \sin x = 1$, is
- (a) $\cos x$ (b) $\tan x$ (c) $\sec x$ (d) $\sin x$
41. The degree of the differential equation $(d^2 y / dx^2)^3 + (dy / dx)^2 + \sin (dy / dx) + 1 = 0$, is
- (a) 3 (b) 2 (c) 1 (d) not defined
42. The order of the differential equation $2x^2 d^2 y / dx^2 - 3 dy / dx + y = 0$, is
- (a) 2 (b) 1 (c) 0 (d) not defined
43. The number of arbitrary constants in the general solution of differential equation of fourth order is
- (a) 0 (b) 2 (c) 3 (d) 4
44. The number of arbitrary constants in the particular solution of a differential equation of second order is (are)
