

QB365 Question Bank Software Study Materials

Differential Equations 50 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

Business Maths and Statistics

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

- 1) The degree of the differential equation $\frac{d^4y}{dx^4} - \left(\frac{d^2y}{dx^2}\right)^4 + \frac{dy}{dx} = 3$ _____.
- (a) 1 (b) 2 (c) 3 (d) 4
- 2) The order and degree of the differential equation $\sqrt{\frac{d^2y}{dx^2}} = \sqrt{\frac{dy}{dx}} + 5$ are respectively _____.
- (a) 2 and 3 (b) 3 and 2 (c) 2 and 1 (d) 2 and 2
- 3) The order and degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^{\frac{3}{2}} - \sqrt{\left(\frac{dy}{dx}\right)} - 4 = 0$ are respectively _____.
- (a) 2 and 6 (b) 3 and 6 (c) 1 and 4 (d) 2 and 4
- 4) The differential equation $\left(\frac{dx}{dy}\right)^3 + 2y^{\frac{1}{2}} = x$ is _____.
- (a) of order 2 and degree 1 (b) of order 1 and degree 3 (c) of order 1 and degree 6 (d) of order 1 and degree 2
- 5) The differential equation formed by eliminating a and b from $y = ae^x + be^{-x}$ is _____.
- (a) $\frac{d^2y}{dx^2} - y = 0$ (b) $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$ (c) $\frac{d^2y}{dx^2} = 0$ (d) $\frac{d^2y}{dx^2} - x = 0$
- 6) The integrating factor of the differential equation $\frac{dx}{dy} + Px = Q$ is _____.
- (a) $e^{\int Pdx}$ (b) $\int Pdx$ (c) $\int Pdy$ (d) $e^{\int Pdy}$
- 7) If $y = cx + c - c^3$ then its differential equation is _____.
- (a) $y = \frac{dy}{dx} + \frac{dy}{dx} - \left(\frac{dy}{dx}\right)^3$ (b) $y = \left(\frac{dy}{dx}\right)^3 = x \frac{dy}{dx} - \frac{dy}{dx}$ (c) $\frac{dy}{dx} + y = \left(\frac{dy}{dx}\right)^3 - x \frac{dy}{dx}$ (d) $\frac{d^3y}{dx^3} = 0$
- 8) The complementary function of $(D^2 + 4)y = e^{2x}$ is _____.
- (a) $(Ax + B)e^{2x}$ (b) $(Ax + B)e^{-2x}$ (c) $A \cos 2x + B \sin 2x$ (d) $Ae^{-2x} + Be^{2x}$
- 9) The differential equation of $y = mx + c$ is _____.(m and c are arbitrary constants)
- (a) $\frac{d^2y}{dx^2} = 0$ (b) $y = x \frac{dy}{dx} + c$ (c) $xdy + ydx = 0$ (d) $ydx - xdy = 0$
- 10) The particular integral of the differential equation is $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 16y = 2e^{4x}$ _____.
- (a) $\frac{x^2 e^{4x}}{2!}$ (b) $\frac{e^{4x}}{2!}$ (c) $x^2 e^{4x}$ (d) xe^{4x}
- 11) Solution of $\frac{dy}{dx} + Px = 0$ _____.
- (a) $x = ce^{py}$ (b) $x = ce^{-py}$ (c) $x = py + c$ (d) $x = cy$
- 12) If $\sec^2 x$ is an integrating factor of the differential equation $\frac{dy}{dx} + Py = Q$ then $P =$ _____.
- (a) $2 \tan x$ (b) $\sec x$ (c) $\cos^2 x$ (d) $\tan^2 x$
- 13) The integrating factor of $x \frac{dy}{dx} - y = x^2$ is _____.
- (a) $\frac{-1}{x}$ (b) $\frac{1}{x}$ (c) $\log x$ (d) x

- 14) The solution of the differential equation $\frac{dy}{dx} + Py = Q$ where P and Q are the function of x is _____.
 (a) $y = \int Qe^{\int P dx} dx + c$ (b) $y = \int Qe^{-\int P dx} dx + c$ (c) $ye^{\int P dx} = \int Qe^{\int P dx} dx + c$ (d) $ye^{\int P dx} = \int Qe^{-\int P dx} dx + C$
- 15) The differential equation formed by eliminating A and B from $y = e^{-2x}(A \cos x + B \sin x)$ is _____.
 (a) $y_2 - 4y_1 + 5 = 0$ (b) $y_2 + 4y_1 - 5 = 0$ (c) $y_2 - 4y_1 - 5 = 0$ (d) $y_2 + 4y_1 + 5 = 0$
- 16) The particular integral of the differential equation $f(D)y = e^{ax}$ where $f(D) = (D-a)^2$ _____.
 (a) $\frac{x^2}{2}e^{ax}$ (b) xe^{ax} (c) $\frac{x}{2}e^{ax}$ (d) x^2e^{ax}
- 17) The differential equation of $x^2 + y^2 = a^2$ _____.
 (a) $x dy + y dx = 0$ (b) $y dx - x dy = 0$ (c) $x dx - y dy = 0$ (d) $x dx + y dy = 0$
- 18) The complementary function of $\frac{d^3y}{dx^3} - \frac{dy}{dx} = 0$ is _____.
 (a) $A + Be^x$ (b) $(A + B)e^x$ (c) $(Ax + B)e^x$ (d) $Ae^x + B$
- 19) The P.I of $(3D^2 + D - 14)y = 13e^{2x}$ is _____.
 (a) $\frac{x}{2}e^{2x}$ (b) xe^{2x} (c) $\frac{x^2}{2}e^{2x}$ (d) $13xe^{2x}$
- 20) The general solution of the differential equation $\frac{dy}{dx} = \cos x$ is _____.
 (a) $y = \sin x + 1$ (b) $y = \sin x - 2$ (c) $y = \cos x + c$, c is an arbitrary constant
 (d) $y = \sin x + c$, c is an arbitrary constant
- 21) A homogeneous differential equation of the form $\frac{dy}{dx} = f\left(\frac{y}{x}\right)$ can be solved by making substitution, _____.
 (a) $y = vx$ (b) $v = yx$ (c) $x = vy$ (d) $x = v$
- 22) A homogeneous differential equation of the form $\frac{dx}{dy} = f\left(\frac{y}{x}\right)$ can be solved by making substitution, _____.
 (a) $x = vy$ (b) $y = vx$ (c) $y = v$ (d) $x = v$
- 23) The variable separable form of $\frac{dy}{dx} = \frac{y(x-y)}{x(x+y)}$ by taking $y = vx$ and $\frac{dy}{dx} = v + x \frac{dv}{dx}$ is _____.
 (a) $\frac{2v^2}{1+v} dv = \frac{dx}{x}$ (b) $\frac{2v^2}{1+v} dv = -\frac{dx}{x}$ (c) $\frac{2v^2}{1-v} dv = \frac{dx}{x}$ (d) $\frac{1+v}{2v^2} dv = -\frac{dx}{x}$
- 24) Which of the following is the homogeneous differential equation?
 (a) $(3x-5)dx = (4y-1)dy$ (b) $xy dx - (x^3+y^3)dy = 0$ (c) $y^2 dx + (x^2 - xy - y^2)dy = 0$ (d) $(x^2+y)dx = (y^2+x)dy$
- 25) The solution of the differential equation $\frac{dy}{dx} = \frac{y}{x} + \frac{f\left(\frac{y}{x}\right)}{f'\left(\frac{y}{x}\right)}$ is _____.
 (a) $f\left(\frac{y}{x}\right) = k \cdot x$ (b) $xf\left(\frac{y}{x}\right) = k$ (c) $f\left(\frac{y}{x}\right) = ky$ (d) $yf\left(\frac{y}{x}\right) = k$
- 26) The differential equation of all circles with centre at the origin is _____.
 (a) $x dy + y dx = 0$ (b) $x dy - y dx = 0$ (c) $x dx + y dy = 0$ (d) $x dx - y dy = 0$
- 27) The degree of the differential equation $\sqrt{1 + \left(\frac{dy}{dx}\right)^2} = \frac{d^2y}{dx^2}$ is _____.
 (a) 1 (b) 2 (c) 3 (d) 6
- 28) The degree and order of $\frac{d^2y}{dx^2} - 6\sqrt{\frac{dy}{dx}} = 0$ are _____.
 (a) 2,1 (b) 1,2 (c) 2,2 (d) 1,1
- 29) Integrating factor of $\frac{dy}{dx} + \frac{1}{x \log x} y = \frac{2}{x^2}$ is _____.
 (a) e^x (b) $\log x$ (c) $\frac{1}{x}$ (d) e^{-x}
- 30) The differential equation of the family of lines $y=mx$ is _____

- (a) $\frac{dy}{dx}=m$ **(b) $y \, dx - x \, dx$** (c) $\frac{d^2y}{dx^2}=0$ (d) $y \, dx + x \, dy=0$
- 31) The P.I. of the differential equation $f(D)y = e^{ax}$ where $f(D) = (D-a)g(D)$, $g(a) \neq 0$ is _____
 (a) me^{ax} (b) $\frac{e^{ax}}{g(a)}$ (c) $g(a)e^{ax}$ **(d) $\frac{xe^{ax}}{g(a)}$**
- 32) The solution of $x \, dx + y \, dy = 0$ is _____
(a) $x^2 + y^2 = c$ (b) $\frac{x}{y} = c$ (c) $x^2 - y^2 = c$ (d) $xy = c$
- 33) When $y = vx$, the differential equation $x \frac{dy}{dx} = y + \sqrt{x^2 + y^2}$ reduces to _____
 (a) $\frac{dv}{\sqrt{v^2-1}} = \frac{dx}{x}$ (b) $\frac{v \, dv}{\sqrt{v^2+1}} = \frac{dx}{x}$ **(c) $\frac{dv}{\sqrt{v^2+1}} = \frac{dx}{x}$** (d) $\frac{v \, dv}{\sqrt{1-v^2}} = \frac{dx}{x}$
- 34) The solution of the equation of the type $\frac{dy}{dx} + Py = 0$ (P is a function of x) is given by _____
(a) $ye^{\int P \, dx} = c$ (b) $y \int P \, dx = c$ (c) $xe^{\int P \, dx} = y$ (d) $y = cx$
- 35) The complementary function of the differential equation $(D^2 - 2D + 1)y = e^{2x}$ is _____
 (a) $(Ae^x + Be^{-x})$ (b) $A + Be^x$ **(c) $(Ax + B)e^x$** (d) $A + Be^{-x}$
- 36) The solution of $\frac{d^2y}{dx^2} - y = 0$ is _____
 (a) $(A + B)e^x$ (b) $(Ax + B)e^{-x}$ **(c) $Ae^x + \frac{B}{e^x}$** (d) $(A + Bx)e^{-x}$
- 37) A particular integral of $(3D^2 + D - 14)y = 13e^{2x}$ is _____
 (a) $\frac{x^2}{2}e^{2x}$ **(b) xe^{2x}** (c) xe^{-2x} (d) $\frac{x}{2}e^{-2x}$
- 38) The particular integral of the differential equation $(D)y = e^{ax}$ where $(D) = (D - a)g(D)$, $g(a) \neq 0$ is _____
 (a) me^{ax} (b) $\frac{e^{ax}}{g(a)}$ (c) $g(a)e^{ax}$ **(d) $\frac{xe^{ax}}{g(a)}$**
- 39) The degree of the differential equation $\left(\frac{d^2y}{dx^2}\right)^2 - \left(\frac{dy}{dx}\right) = y^3$ is _____
 (a) $1/2$ **(b) 2** (c) 3 (d) 4
- 40) The degree of the differential equation $\left[5 + \left(\frac{dy}{dx}\right)^2\right]^{5/3} = x^5 \left(\frac{d^2y}{dx^2}\right)$ is _____
 (a) 4 **(b) 3** (c) 5 (d) 10
- 41) 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) $y^2 = 2x$
- 42) The solution of the differential equation $\frac{dy}{dx} - \frac{y(x+1)}{x} = 0$ is given by _____
(a) $y = xe^{x+c}$ (b) $x = ye^x$ (c) $y = x + c$ (d) $xy = e^x + c$
- 43) The solution of the differential equation $x \frac{dy}{dx} = y + x \tan \frac{y}{x}$ is _____
 (a) $\sin \frac{x}{y} = x + c$ **(b) $\sin \frac{y}{x} = cx$** (c) $\sin \frac{x}{y} = cy$ (d) $\sin \frac{y}{x} = cy$
- 44) The differential equation satisfied by $ax^2 + bx^2 = 1$ is _____
 (a) $xyy_2 + y_1^2 + yy_1 = 0$ **(b) $xyy_2 + xy_1^2 - yy_1 = 0$** (c) $xyy_2 - xy_1^2 + yy_1 = 0$ (d) none of these
- 45) The solution of the differential equation $(x^2 + 1) \frac{dy}{dx} + (y^2 + 1) = 0$ is _____
 (a) $y = 2 + x^2$ (b) $y = \frac{1+x}{1-x}$ (c) $y = x(x - 1)$ **(d) $y = \frac{1-x}{1+x}$**
- 46) The differential equation $x \frac{dy}{dx} - y = x^2$ has the general solution _____
 (a) $y - x^3 = 2cx$ **(b) $2y - x^3 = cx$** (c) $2y + x^2 = 2cx$ (d) $y + x^2 = 2cx$

- 47) What is the integrating factor of $\frac{dy}{dx} + y \sec x = \tan x$?
- (a) **sec x + tan x** (b) $\log(\sec x + \tan x)$ (c) $e^{\sec x}$ (d) $\sec x$
- 48) The order of the differential equation $2x^2 \frac{d^2y}{dx^2} - 3 \frac{dy}{dx} + y = 0$ is _____
- (a) **2** (b) 1 (c) 0 (d) not defined
- 49) Which of the following differential equation has $y = c_1 e^x + c_2 e^{-x}$ as the general solution?
- (a) $\frac{d^2y}{dx^2} + y = 0$ (b) **$\frac{d^2y}{dx^2} - y = 0$** (c) $\frac{d^2y}{dx^2} + 1 = 0$ (d) $\frac{d^2y}{dx^2} - 1 = 0$
- 50) In interpolation the independent variable y is called the _____
- (a) **entry** (b) argument (c) modulus (d) amplitude