Easy Category

1	The degree and order of the differential equation $(y^{lll})^{3/2} + (y^{l})^2 = x^3$is : a. 3,3 b. $3/2\,,3$ c. $3,3/2$ d. 1,3
2	The degree and order of the differential equation $\frac{[y^{ll}-(y^{l})]^{1/2}}{x} = y$is : a.1,2 b. $1/2\,,2$ c. 2,1 d. $1/2\,,1/2$
3	The differential equation $y^{lll} - 2y^{ll} = 4y + x^3$ is : a. Linear differential equation with constant coefficients b. Linear differential equation with variable coefficients c. Non - linear differential equation d. Cauchy's differential equation
4	The differential equation $y^{ll} - xy^{l} + x^2y = \cos x$ is : a. Linear differential equation with variable coefficients b. Linear differential equation with constant coefficients c. Non - linear differential equation d. Cauchy's differential equation
5	The differential equation $y^{lll} - yy^{ll} + xy^3y^{l} = 0$ is : a. Non - linear differential equation b. Linear differential equation with constant coefficients c. Linear differential equation with variable coefficients d. Cauchy's differential equation
6	The differential equation $x^3y^{lll} - 2xy^{l} = \log x$ is : a. Cauchy's differential equation b. Exact Differential equation c. Non - linear differential equation d. Linear differential equation with constant coefficients
7	A particular solution of the differential equation $y^{ll} - 2y^{l} + y = 0$ is : a. $y = 2e^{x}$ b. $y = e^{2x}$ c. $y = e^{-x}$ d. $y = 1$
8	A particular solution of the differential equation $y^{ll} - y = 0$ is : a. $y = 2e^{x}$ b. $y = e^{2x}$ c. $y = e^{-2x}$ d. $y = 2e^{2x}$
9	A particular solution of the differential equation $y^{ll} + 9y = 0$ is : a. $y = \sin 3x$ b. $y = 3\sin x$ c. $y = 3\cos x$ d. $y = \sin 9x$
10	A particular solution of the differential equation $y^{lll} = 0$ is :

	a. $y = x^2 y = x^3$ b. c. $y = x^4 + x$ d. $y = (x-1)^4$
11	The complementary function of the differential equation $(D-3)^2 y = e^{3x}$is : a. $y_c = (C_1 + C_2 x)e^{3x}$ b. $y_c = (C_1 + C_2)xe^{3x}$ c) $y_c = (C_1 e^{3x} + C_2 e^{-3x})$ d. $y_c = (C_1 + C_2 x)$
12	The complementary function of $y^{ll} - 2y^l + y = xe^x \sin x$is : a)$y_c = (C_1 x + C_2)e^x$ b) $y_c = (C_1 e^x + C_2 e^{-x})$ c)$y_c = (C_1 + C_2 x)e^{-x}$ d)$y_c = (C_1 x + C_2)e^{2x}$
13	The complementary function of $(D^2 + 3D - 4)y = 12e^{2x}$is : a) $y_c = (C_1 e^{-4x} + C_2 e^x)$ b) $y_c = (C_1 e^{-x} + C_2 e^{-4x})$ c)$y_c = (C_1 e^{-4x} + C_2 e^{-x})$ d) $y_c = (C_1 e^{4x} + C_2 e^{-4x})$
14	The complementary function of $y^{ll} + 9y = \sin^2 x$ is : a.$y_c = C_1 \cos 3x + C_2 \sin 3x$ b.$y_c = (C_1 e^{3x} + C_2 e^{-3x})$ c) $y_c = (C_1 + C_2 x)e^{3x}$ d)$y_c = C_1 \cos x + C_2 \sin x$
15	The complementary function of the differential equation $\frac{d^2y}{dx^2} - \frac{dy}{dx} = 0$is : a)$y_c = (C_1 + C_2 e^x)$ b)$y_c = (C_1 + C_2)e^x$ c)$y_c = (C_1 x + C_2)e^x$ d)$y_c = C_1 e^{-x} + C_2$
16	The absolute value of the Wronskian of $e^{2x}$and$xe^{2x}$is : a)e^{4x} b)e^{-2x} c)e^{2x} d)e^{-4x}
17	9.The absolute value of the Wronskian of $\cos 2x$and$\sin 2x$is : a)2 b)4 c) 3 d)1
18	The Cauchy's differential equation $x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} = 1$can be transformed in to a linear differential equation with constant coefficients, by taking$x$as : a)e^t b. $\log t$ c) e^{-t} d)$\frac{1}{t}$
19	If $D$is the differential operator, then for any function $f(x)$, $\frac{1}{D}f(x)$represents: a. $\int f(x)dx$ b. $\int f(D)dx$ c. $\frac{d}{dx}f(x)$ d. $\frac{f(D)}{x}$
20	If $y_1$and $y_2$are the solutions of a homogeneous differential equation, then which of the following is also a solution of the same equation: a. $y_1 + y_2$ b. $\frac{y_1}{y_2}$ c. $y_1 y_2$ d. ${y_1}^2 + {y_2}^2$
21	The number of arbitrary constants in the general solution of a 3rd order differential equation is : a. 3 b. 0 c. 4 d. 2
22	The particular integral of the differential equation $f(D)y = xe^x$is : a. $e^x \frac{1}{f(D+1)} x$ b. $e^x \frac{1}{f(D-1)} x$ c. $e^x \frac{1}{f(D)} x$ d. $\frac{1}{f(D+1)} xe^x$

23	Which of the following option is true for the differential equation$\frac{d^2y}{dx^2} - 49y = 0$: a)The roots of the auxiliary equation are 7 and -7 b)The roots of the auxiliary equation are $\pm 7i$ c)The auxiliary equation has a repeated root of 7 d)The roots of the auxiliary equation are 0 and 7
24	The general solution of the differential equation $f(D)y = X$;where $X$is a non – zero function of$x$,contains: a. Both complementary function and particular integral b. Only complementary function c. Only particular integral d. Neither complementary function nor particular integral
25	A differential equation is considered to be ordinary if it has : (A) one independent variable B) more than one dependent variable (C) two independent variable (D) more than two independent variable

Difficult Category

1	If $y = e^{2x}$ is a solution of the differential equation $y^{ll} - 5y^{l} + ky = 0$,then the value of $k$is : a. 6 b. - 6 c. 0 d. 4
2	If $y = \sin 2x$is a solution of the differential equation $y^{ll} - ky = 0$,then the value of $k$is : a. - 4 b. 2 c. -2 d. 4
3	The two linearly independent solutions of the differential equation $(D-2)^2y = 0$is : a. e^{2x}, xe^{2x} b. $2e^{x}, 2xe^{x}$ c. $2e^{2x}, 4e^{2x}$ d. $xe^{2x}, 2xe^{2x}$
4	The two linearly independent solutions of the differential equation $(D^2 + 16)y = 0$is : a. $\cos 4x, \sin 4x$ b. $\cos 2x, \sin 2x$ c. $4\cos x, 4\sin x$ d.$e^{x}\cos 4x, e^{x}\sin 4x$
5	If two roots of the auxiliary equation of a second order linear differential equation with constant coefficients are real and distinct, then the complementary solution is of the form:

	a. $y_c = Ae^{m_1x} + Be^{m_2x}$ b. $y_c = Ae^{mx} + Bxe^{mx}$ c. $y_c = Ae^{mx} + Be^{mx}$ d. $y_c = A + Bx$
6	If two roots of the auxiliary equation of a second order linear differential equation with constant coefficients are real and equal, then the complementary solution is of the form: a. $y_c = Ae^{mx} + Bxe^{mx}$ b. $y_c = Ae^{m_1x} + Be^{m_2x}$ c. $y_c = Ae^{mx} + Be^{mx}$ d. $y_c = Ae^{m_1x} + Bxe^{m_2x}$
7	If two roots of the auxiliary equation of a second order linear differential equation with constant coefficients are purely imaginary, then the complementary solution is of the form: a. $y_c = A\cos\beta x + B\sin\beta x$ b. $y_c = A\cos\beta x$ c. $y_c = A\sin\beta x$ d. $y_c = Ae^{\alpha x}\cos\beta x + Be^{\alpha x}\sin\beta x$
8	If two roots of the auxiliary equation of a second order linear differential equation with constant coefficients are equal to zero , then the complementary solution is of the form: a. $y_c = A + Bx$ b. $y_c = Ae^{m_1x} + Be^{m_2x}$ c. $y_c = A + Bx + Cx^2$ d. $y_c = Ae^{mx} + Be^{mx}$
9	If the roots of the auxiliary equation of a differential equation are $0,1,0$then the differential equation is : a. $(D^3 - D^2)y = 0$ b. $(D-1)^3y = 0$ c. $(D^2 - D)y = 0$ d. $D^3y = y$
10	If the roots of the auxiliary equation of a differential equation are $1 \pm i$then the differential equation is : a. $(D^2 - 2D + 2)y = 0$ b. $(D^2 + 2D - 2)y = 0$ c. $(D^2 + 4D + 4)y = 0$ d. $(D^2 - 4D + 4)y = 0$
11	The particular integral of $(D^2 + 3D - 4)y = 12e^{2x}$ is : a) $2e^{2x}$ b) $y_p = e^{2x}$ c) $y_p = 3e^{2x}$ d) $y_p = -2e^{2x}$
12	If $f(D) = D^2 - 2$,then $\frac{1}{f(D)}e^{2x}$is : a)$\frac{e^{2x}}{2}$ b)$2e^{2x}$ c) e^{2x} d)$\frac{e^{2x}}{-6}$
13	If $f(D) = D^2 + 36$,then $\frac{1}{f(D)}4\cos 2x$ is a)$\frac{\cos 2x}{8}$ b)$\frac{x}{3}\cos 2x$ c)$\frac{x}{3}\sin 2x$ d)$x\cos 2x$
14	$y = (C_1e^{-6x} + C_2e^{2x})$is the general solution of the equation: a)$y^{ll} + 4y^{l} - 12y = 0$ b)$y^{ll} - 4y^{l} - 12y = 0$ c)$y^{ll} - 4y^{l} + 12y = 0$ d)$y^{ll} + 4y^{l} + 12y = 0$
15	$y = C_1\cos 2x + C_2\sin 2x$is the general solution of the equation a)$y^{ll} + 4y = 0$ b)$y^{ll} - 4y = 0$ c)$y^{ll} - 2y = 0$ d)$y^{ll} + 2y = 0$

16	The particular integral of the differential equation $\frac{d^2y}{dx^2} = x$is : a. $y_p = \frac{x^3}{6}$ b. $y_p = \frac{x^2}{2}$ c. $y_p = \frac{x^3}{3}$ d. $y_p = 1 + x$
17	For $(D^2 + 4)y = \tan 2x,$ solving by variation of parameters, the absolute value of the Wronskian W is : a. 2 b. 4 c . 1 d. - 4
18	Which of the following is not a solution of $y^{ll} + y = 0$: a. $y = \sin 2x$ b. $2\sin x$ c. $y = \cos x$ d. $y = 2\cos x$
19	Which of the following is not a solution of $y^{ll} - 5y^{l} + 6y = 0$: a. $y = e^{-2x}$ b. $y = e^{2x}$ b. $y = e^{3x}$ d. $y = 10e^{2x}$
20	The Cauchy's differential equation $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = \log x$on substituting $x = e^t$,reduces to : a. $\frac{d^2y}{dt^2} = t$ b. $\frac{d^2y}{dt^2} = \log t$ c. $\frac{d^2x}{dt^2} = t$ d. $\frac{d^2y}{dt^2} = e^t$
21	The particular integral of $(D^2 - 6D + 9)y = \log 2$is : a)$y_p = \frac{\log 2}{9}$ b)$y_p = \frac{\log 2}{3}$ c)$y_p = \frac{\log 2}{4}$ d)$y_p = \log 2$
22	The Cauchy's differential equation $2x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} = x$on substituting $x = e^t$,reduces to : a$2\frac{d^2y}{dt^2} - \frac{dy}{dt} = e^t$. $2\frac{d^2y}{dt^2} + \frac{dy}{dt} = t$ b. $2\frac{d^2x}{dt^2} + \frac{dx}{dt} = e^t$ c. $2\frac{d^2y}{dt^2} + \frac{dy}{dt} = e^t$ d.
23	The particular integral of $(D + 5)(D - 4)y = 1000$is : a) $y_p = -50$ b) $y_p = 50$ c) $y_p = 100$ d)$y_p = -100$
24	The particular integral of the differential equation$(D - 1)y = -x$is : a. $y_p = x + 1$ b. $y_p = x - 1$ c. $y_p = x$ d. $y_p = 2x + 1$
25	The solution of the initial value problem $(D - 2)(D - 3)y = 0; y(0) = 0, y^{l}(0) = -1$is: a. $y = e^{2x} - e^{3x}$ b. $y = e^{2x} + e^{3x}$ c. $y = e^{-2x} - e^{-3x}$ b. $y = e^{-2x} + e^{-3x}$