

CHAPTER:HIGHER ORDER DIFFERENTIAL EQUATION

	Find the Wronskians and use it to verify linear independence	
(1)	$x^2, x^2 \ln x$	[L.I]
(2)	e^x, xe^x, e^{4x}	[L.I]
(3)	e^x, xe^x	[L.I]
(4)	$\cos wx, \sin wx$	[L.I]
	Without solving D.E determine the wronskians of solution to the given D.E	
(5)	$(x^2 + 1)y'' + 2xy' = 0$	
(6)	$x^2 y'' - xy' + y = 0$	
	Find a basis of solution of following second order homogeneous linear equation	
(7)	$x^2 y'' - xy' + y = 0 ; y_1 = x$	
(8)	$(1 - x^2)y'' - 2xy' + 2y = 0 , y_1 = x$	
(9)	$xy'' + 2y' + xy = 0 , y_1 = \frac{\sin x}{x}$	
	Verify that the given functions form a basis of solution of the given equation and solve the given IVP.	
(10)	$y'' + 9y = 0 , y(0) = 4, y'(0) = -6$	
(11)	$y'' - y = 0 , y(0) = 4, y'(0) = -2,$	
(12)	$4x^2 y'' - 3y = 0 , y(1) = 3, y'(1) = 2.5,$	
	Find the general solution of homogeneous differential equation.	
(13)	$16y'' - 8y' + 5y = 0$	
(14)	$y''' - y'' + 100y' - 100y = 0; y(0) = 4, y'(0) = 11, y''(0) = -299$	
(15)	$y'' - 5y' + 6y = 0; y(1) = e^2, y'(1) = 3e^2$	
(16)	$y'' - 2\sqrt{2}y' + 2y = 0$	
(17)	$y'' + 4y' + 4 = 0; y(0) = 1, y'(0) = 1$	
(18)	$(x^2 D^2 - 3xD + 4)y = 0; y(1) = 0, y'(1) = 3$	
(19)	$y'' + y' - 2y = 0, y(0) = 4, y'(0) = -5$	
(20)	$\frac{d^4 y}{dx^4} - 18\frac{d^2 y}{dx^2} + 81y = 0$	

	Find the general solution of non homogeneous differential equation.
(21)	$y''' + 3y'' + 3y' + y = e^{-x}$
(22)	$y'' + y = \sec x$
(23)	$y'' - 3y' + 2y = e^x$
(24)	$(D^3 - 3D + 2)y = \sin(3x + 2)$
(25)	$y'' + 4y = \sin x + \sin 2x$
(26)	$y'' + 4y = 8e^{-2x} + 4x^2 + 2; y(0) = 2, y'(0) = 2$
(27)	$(2 - D^2)y = x^4 + 3x + 2$
(28)	$(D^2 - 4D + 4)y = \frac{e^{2x}}{1 + x^2}$
(29)	$(D^2 - 3D + 2)y = 2e^x \cos \frac{x}{2}$
(30)	$(D^2 - 1)y = xe^x \sin x$
(31)	$(D^2 + 4)y = x \sin x$
(32)	$(D^2 + a^2)y = \operatorname{cosec} ax$
	Find the general solution by undetermined coefficients.
(33)	$y'' + 4y = 2\sin 3x$
(34)	$y'' + 4y = 8x^2$
(35)	$y''' + 3y'' + 3y' + y = 30e^{-x}; y(0) = 3, y'(0) = -3, y''(0) = -47$
(36)	$\frac{d^4y}{dt^4} - 2\frac{d^2y}{dt^2} + y = \cos t + e^{2t} + e^t$
(37)	$y'' - 4y = e^{-2x} - 2x, y(0) = 0, y'(0) = 0$
(38)	$y'' + 2y' + 10y = 25x^2 + 3$
	Find the general solution by variation of parameter :-
(39)	$y'' + 2y' + y = e^{-x} \cos x$
(40)	$x^3y''' - 3x^2y'' + 6xy' - 6y = x^4 \log x$
(41)	$(D^3 + D)y = \operatorname{cosec} x$
(42)	$y'' + y = \sec x$

(43)	$(D^2 - 2D + 1)y = 3x^{3/2}e^x$
(44)	$y'' + 9y = \sec 3x$
(45)	$(D^2 + 4D + 4)y = \frac{e^{-2x}}{x^2}$
	Solve the Euler-Cauchy equation.
(46)	$x^2y'' - 20y = 0$
(47)	$x^2y'' - 4xy' + 6y = 21x^{-4}$
(48)	$(4x^2D^2 + 12xD + 3)y = 0$
(49)	$(x^2D^2 - 2xD + 2)y = x^2 \cos x$
(50)	$(x^2D^2 + 1.25)y = 0$

