Birzeit University

Department of Mathematics

Homework 3.5+4.2+4.3

Math331 November 5, 2019

First Semester 2019/2020 Section: 3

Name: _____ Number: _____

Q1. Solve the following homogeneous differential equations.

1. $y^{(4)} + y''' - 7y'' - y' + 6y = 0.$
2. $y''' + y = 0.$
3. $y''' - y'' + y' - y = 0.$
4. $y^{(4)} - 4y''' + 4y'' = 0.$
5. $y^{(5)} + 3y^{(4)} - 5y''' + 17y'' - 36y' + 20y = 0.$
6. $4y''' + y' + 5y = 0,\ \ y(0) = 2,\ y'(0) = 1,\ y''(0) = -1.$
7. Given that $y_1 = te^{5t}$ is a solution of
$$y^{(4)} - 12y''' + 47y'' - 70y' + 50y = 0.$$
Find the general solution of the given differential equation.
8. Given that $y_1 = \sin t$ is a solution of
$$y^{(4)} + 2y''' + 11y'' + 2y' + 10y = 0.$$
Find the general solution of the given differential equation.

Q2. Find the form of y_p for the following differential equations.

1. $y''' - 3y'' + 3y' - y = 4e^t.$
2. $y^{(4)} + 2y'' + y = 3\sin t - 5\cos t.$
3. $y^{(5)} + 4y''' = 8\sin 2t.$
4. $y''' + y'' - 2y' = (100 - t)e^t.$
5. $y''' - 2y'' + y' - 2y = (10t - 1)\sin t.$
6. $y'' - 8y' + 25y = 5t^3e^{-t} - 7e^{-t}.$
7. $y''' + y'' = e^t\cos t.$
8. $y^{(4)} + y''' = 1 - t^2e^{-t}.$
9. $y''' - 5y'' + 3y' + y = e^t.$
10. $y''' - 3y'' + 2y' = t + e^t,\ \ y(0) = 1,\ y'(0) = -\frac{1}{4},\ y''(0) = -\frac{3}{2}.$

Good Luck