12/5/1428

KING SAUD UNIVERSITY
DEPARTMENT OF MATHEMATICS

TIME: 1.30 HOURS FULL MARKS: 40

Question 1. Solve the differential equation **[8]**

$$y''-2y'+y = e^x(\sec x)^2\tan x.$$

Question 2. Solve the Cauchy Euler differential equation **[8]**

$$(2x+1)^2y'' - (2x+1)y' + 2y = (2x+1)e^x, \quad x > -1/2.$$

Question 3. . Find a power series solution about the point $x_0 = 0$ of the differential equation $(x^2+2)y'' - 5xy'+y = 0$ **[8]**

Question 4. Find the general solution of **[8]**

$$y'''-y''+y'-y = \sin t + e^t$$

Question 5. If $y_1 = \ln x$ is a solution of the differential equation $xy''+y' = 0,$ use the reduction of order method to find a second solution y_2. **[8]**