19/4/1427

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. Solve the system **[8]**

$$\frac{dx}{dt} = 2x - 5y - \sin 2t$$
$$\frac{dy}{dt} = x - 2y + t.$$

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 diffrential equation $xy''+y' = 0,$ use the reduction of order method to find a second solution y_2. **[8]**