UNIT I - Exam

Find the general solution to the given Differential Equations, if initial conditions are given then find the specific solution

1 $y'(x^2 + 2) + 4x(y^2 + 2y + 1) = 0, \quad y(1) = 1$

2 $(x - 1)y' + 3y = \dfrac{1}{(x - 1)^3} + \dfrac{\sin x}{(x - 1)^2}, \quad y(0) = 1$

3 $(12x^3y + 24x^2y^2)\,dx + (9x^4 + 32x^3y + 4y)\,dy = 0$

4 $(y'x - y)(\ln|y| - \ln|x|) = x$

Build the Model, its time characteristic and answer the question

5 A tank initially contains 100 liters of a salt solution with a concentration of .1 g/liter. A solution with a salt concentration of .3 g/liter is added to the tank at 5 liters/min, and the resulting mixture is drained out at the same rate. Find the concentration $K(t)$ of salt in the tank as a function of t.