

Exam TWO, MTH 205, Summer 2009

Ayman Badawi

QUESTION 1. (12 points) Solve: $y^{(2)} + \frac{1}{x}y' = 10$

QUESTION 2. (12 points) Solve: $xy^{(2)} + y' + \frac{4}{x}y = 0, y(1) = 4, y'(1) = -6$

QUESTION 3. (12 points) Solve: $y^{(5)} + 4y^{(3)} = 12$

QUESTION 4. (14 points) USE THE UCM to solve : $y^{(2)} - 3y' + 2y = 6 + 4e^{2x}$

QUESTION 5. (12 points) Solve : $y' + y = \sec^2(x) + \tan(x)$

QUESTION 6. (14 points) Solve : $(3x + 2)y' + \frac{9}{4}y = \frac{6e^{2x}}{4} \frac{1}{\sqrt[3]{y}}$

QUESTION 7. (12 points) A cup of tea with Temperature 34° is placed in a room temperature 22° . After 4 minutes the temperature of the tea became 30° . What will be the temperature of the tea after 10 minutes? How long does it take before the temperature of the tea reach 24° ?

QUESTION 8. (12 points) A tank has a capacity of 130 liters, it contains 100 liters in which 10 grams of salt is dissolved. A mixture containing 2 grams of salt per liter is pumped into the tank at rate of 6 liter/min; the well-mixed solution is pumped out at rate 3 liter/min. Find the amount of salt, $A(t)$, in the tank at any time t . When does an overflow occur? How much salt will be in the tank at the time it overflows? what is the concentration of the salt in the tank at the time it overflows?

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