ECN 5320/6320

HW 2
Fall 2022
100 pts.

Name:_____

A-Number:_____

Instructions: write derivations and answers to the assignment on separate pieces of paper. Write neatly and clearly!

1. Provide the general and particular solutions to the ODE $\frac{dy}{dt} = 2y(t)$ given $y(0) = 9$. (**5 points**)

2. Provide the general and particular solutions to the ODE $\frac{dy}{dt} = 23$ given $y(0) = 1$. (**5 points**)

3. Provide the general and particular solutions to the ODE $\frac{dy}{dt} = -10y(t) + 15$ given $y(0) = 0$. (**5 points**)

4. Provide the general and particular solutions to the ODE $\frac{dy}{dt} = y(t) + 4$ given $y(0) = 0$. (**5 points**)

5. Provide the general and particular solutions to the ODE $\frac{dy}{dt} = -2ty(t) + t$ given $y(0) = 3/2$. (**5 points**)

6. Provide the general solution to the ODE $\frac{dq}{dt} = -3t^2 q(t)$. (**5 points**)

7. Verify exactness and solve via four-step procedure $dF(y,t) = 3ty^2 \ dy + (y^3 + 2t) \ dt = 0$. (**15 points**)

8. Verify exactness and solve via four-step procedure $\frac{dy}{dt} = -\frac{2y^4 t + 3t^2}{4y^3 t^2}$. (**15 points**)

9. Identify the integrating factor and find the general solution to $dF(y,t) = 4y^3 t \ dy + (2y^4 + 3t) \ dt = 0$. (**20 points**)

10. Identify the integrating factor and find the general solution to $\frac{dy}{dt} = 2ty(t) + bt$. (**20 points**)

Scan your derivations into a single pdf file and upload it to Canvas by **Wednesday 10/5/2022 at 11:59pm**.