CONCORDIA UNIVERSITY
GINA CODY SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

QUIZ #1

ENGR 213: Applied Ordinary Differential Equations: Fall 2021

Instructor: Dr. Sam Eskandarian

Date: THU Sep 30, 2021 Time: 30 + 10 min

NAME: _____
(Please Print) SURNAME FIRST NAME

STUDENT ID: _____ SECTION: _____

SIGNATURE: _____

CLOSED BOOK EXAM

Name and student I/D must be written in INK.

All work must be illustrated in order to gain full marks assigned to the question.

INDIVIDUAL WORK

Material allowed: Approved calculator, Drawing equipment.

Answer the questions in the answer booklets if you have a tablet or on blank paper sheets if you don't.

You may use the cellphone applications "Adobe Scan" or "Cam scanner" to scan your answers in pdf format. Other formats are not acceptable.

Use the provided link in MOODLE to submit your answer before the deadline.

PROBLEM #1 (1 Mark):

1. Classify the following differential equation by order and linearity. $y'' = \sqrt{5x^6 + (\sin x)y^{(8)}}$

A. 8th order nonlinear

B. 4th order linear

C. 2nd order linear

D. 2nd order nonlinear

PROBLEM #2 (3 Marks):

Are the following statements TRUE or False?

(a) There is a constant solution to the differential equation: $2y'' - 3y' = y^2 - 6y + 9.$

(b) The function $y = \dfrac{1}{x^2+4}$ is a solution to the IVP $y' + 2xy^2 = 0, \quad y(-3) = \dfrac{1}{5}.$

(c) Every initial value problem has a unique solution.

PROBLEM #3 (2 Marks):

Which of the following is a homogeneous differential equation?

A. $x\tan^{-1}(y)\dfrac{dy}{dx} = e^{x+y}$

B. $y' = \sin(xy)$

C. $(x^2+1)\dfrac{dy}{dx} = \sqrt{y}$

D. $y' = \dfrac{1}{x+y}$

PROBLEM #4 (2 Marks):

Solve the initial value problem $\dfrac{dx}{dt} = t(x-1), \quad x(0) = 7.$

PROBLEM #5 (2 Marks):

The general solution of the differential equation $5\dfrac{dy}{dx} + 30y = 6$ is

A. $y = Ce^{-6x} + \dfrac{1}{5}$

B. $y = \dfrac{1}{5}e^{6x} + C$

C. $y = Ce^{-6x} + \dfrac{1}{5}e^{6x}$

D. $y = \dfrac{1}{5}e^{12x} + Ce^{6x}$