ENCS
Engineering & Computer Science

ENGR 213

Applied Ordinary Differential Equations

Second Mid Term Exam

March 12th 2017

Student Name: _____

Student ID Number: _____

ENGR 213 Section: _____

Course Given BY: _____

- Exam is closed book close notes.
- No use of any electronic devices.
- Use only the approved calculator.
- Write your answers in the provided space.

Q1	
Q2	
Q3	
Q4	
Q5	
Total	

Problem#1

Write the number $(3+6i) + (4-i)(3+5i) + \dfrac{1}{2-i}$ in the form $a+bi$.

Solution:

Problem#2

Verify that $y_1 = e^{5x}$ and $y_2 = e^{-7x}$ are form a fundamental set of solutions of the differential equation $y'' + 2y' - 35y = 0$ on the interval $(-\infty, \infty)$. Write the form of the general solution.

Solution:

Problem#3

Solution:

(a) Write the characteristic equation and the general solution of the differential equation:

$y^{(6)} - 13y^{(5)} + 70y^{(4)} - 198y^{(3)} + 308y'' - 248y' + 80y = 0.$

$y^{(k)}$ is the k-th derivative of y. For Your convenience, the roots of the characteristic equation are: $1, 2, 2, 2, 3 + i, 3 - i$. You do not have to check this.

(b) Find the general solution of the differential equation: $x^2 y'' - 7xy' + 16y = 0$, given one solution $y_1 = x^4$.

Solution:

Problem#4

Using the method of undetermined coefficients, solve the initial value problem

$y''+y'-2y= (6x+2)\ e^{\,x};\ y(0)=0;\ y'(0)=0.$

Solution:

Problem#5

Solve the following differential Equation $y'' + (3/x) y' + (5/x^2) y = 0$

Solution: