Prince Sultan University

Deanship of Educational Services
Department of Mathematics
and
General Sciences

COURSE DETAILS:

DIFFERENTIAL EQUATIONS	MATH 225	MAJOR EXAM II
Semester:	Spring Semester --Term 172	
Date:	Saturday, March 31, 2018	
Time Allowed:	90 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	640, 159
Instructor's Name:	J. Alzabut

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Page 4	Total
Questions	**Q.1 (14 pts)**	**Q.2 (14 pts)**	**Q.3 (14 pts)**	**Q.4 (18 pts)**	**60**
Marks					

Q.1 (14 pts.) Solve the equation $y''' - 2y'' + y' = 2 - 24e^{x} + 40e^{5x}$. Do not find the values of constants of the particular solution.

Q.2 (14 pts.) Find the general solution for the Cauchy Euler equation $x^2y'' - xy' + y = \ln x,\ x > 0.$ Try the initial conditions $y(1) = 1,\ y'(1) = -2$ to find a particular solution.

Q.3 (14 pts.) Find a solution in integral form by using method of variation of parameters to the equation $y'' + y = g(x)$. Replace $g(x)$ by $\cos^2 x$ and find the solution explicitly.

Q.4 (18 pts.) Find a power series solution for the equation $y'' - (1+x)y = 0$.