HO CHI MINH CITY INTERNATIONAL UNIVERSITY

MIDTERM EXAMINATION

Academic year 2017-2018, Semester 1
Duration: 90 minutes

SUBJECT: **Differential Equations**	
Acting Chair of Department of Mathematics Signature: Full name: Associate Prof. Nguyen Dinh	Lecturer: Signature: Full name: Dr. Pham Huu Anh Ngoc

Instructions:

- *Each student is allowed a scientific calculator and maximum of two double sheets of reference material (size A4 or similar) stapled together and marked with their name and ID. All other document and electronic devices are forbiden.*

Question 1. *(20 marks) Find the general solution of the initial value problem*

$$xy' = y + 2x\ln x\,,\ \ y(1) = 0$$

Question 2. *(20 marks) Consider the following differential equation*

$$y\cos x\,dx + (2y + \sin x + 1)dy = 0$$

Is the above equation exact? Solve it.

Question 3. *(20 marks) Find a particular solution of the differential equation*

$$y'' - 4y' + 20y = (x+2)e^{x} + xe^{2x}$$

Question 4. *(20 marks) Solve the following differential equation*

$$(x-2017)^2y'' - (x-2017)y' + y = 2018,\quad x > 2017$$

Question 4. *(20 marks)* (Newton's Law of Cooling) Let us suppose that a murder victim is found at 8:30 am and that the temperature of the body at that time is 30°C. Assume that the room in which the murder victim lay was constant 22°C. Suppose that an hour later the temperature of the body is 28°C. Use this information to determine the approximate time that the murder occurred? (It is know that the normal temperature of a living human body is 37°C)

END.