PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester 1   Academic Year: 2005

Date: October, 12 2005   Time: 9:00-12:00

Subject: 226-607 Advanced Engineerig Mathematics   Room: R200

         for Manufacturing Engineers

Instructions

– This is an opened-book examination.

– There are 4 questions and total score is 50.

– Answer all questions in the answer book.

ทุจริตในการสอบ โทษขั้นต่ำ คือ พักการเรียน 1 ภาคการศึกษา และปรับตกในรายวิชาที่ทุจริต

Name ....   **Student ID** ....

Question #	Full Score	Assigned Score
1	10	
2	10	
3	20	
4	10	
Total	50	

Problem 1 (10 marks) Solve the following initial value problem.

$$x^2 y'' - xy' + y = x^5 \quad , y(1) = 0, y'(1) = 0$$

Problem 2 (10 marks) Find the general solution to the following differential equation near $x = 0$.

$$(1 - x^2)y'' - 2xy' + 2y = 0$$

Problem 3 (20 marks) Find the solution of the following differential equation.

(a) $\quad (2xy\,dx + dy)\,e^{x^2} = 0 \qquad , y(0) = 2$

(b) $\quad 3y'' + 10y' + 3y = 9x + 5\cos x \ , y(0) = 0, y'(0) = -26.5$

Problem 4 (10 marks) Solve the following systems of equations.

$$\cdot \quad y_1' = -3y_1 - 4y_2 + 5e^t$$
$$y_2' = 5y_1 + 6y_2 - 6e^t \qquad\qquad , y_1(0) = 19, y_2(0) = -23$$

Good Luck

Thanate Ratanawilai