

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester 1
Date: 13th October, 2006
Subject: 226-541 Research Methodology

Academic Year: 2006
Time: 9:00-12:00
Room: A 201

ทุกกรณีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา

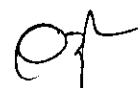
Direction

- There are 3 sets of problem for this exam.
- Score for each question is as following.
Question 1 – 45 marks
Question 2 – 30 marks
Question 3 – 25 marks
- All materials, books, and calculator are allowed.
- Write your name, student ID, and department on every page of test material.

Student Name _____ Student ID _____

Question No.	Full Score	Assigned Score
1	45	
2	30	
3	25	

ดร. บุญศิริ ลิ้มสกุล
ผู้ออกข้อสอบ PART B



1. The response time in milliseconds was determined for three different types of circuits that could be used in an automatic valve shutoff mechanism. The results were

Circuit Type	Response Time				
1	9	12	10	8	15
2	20	21	23	17	30
3	6	5	8	16	7

- 1.1 Test the hypothesis that the three circuit types have the same response time.
Use $\alpha = 0.01$

ชื่อ _____ สกุล _____ รหัสนักศึกษา _____ ภาควิชา _____ ชั้นปี _____

1.2 Use Tukey's test to compare pairs of treatment means.

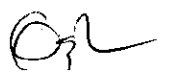


ชื่อ _____ สกุล _____ รหัสนักศึกษา _____ ภาควิชา _____ ชั้นปี _____

1.3 If you were the design engineer and you wished to minimize the response time, which circuit type would you select?

ชื่อ _____ สกุล _____ รหัสนักศึกษา _____ ภาควิชา _____ ชั้นปี _____

2. List at least three procedures to check for model adequacy and explain the reason for checking of each procedure and how to interpret the result including any solution in case model have any violation of basic assumption.



3. Four different designs for a digital computer circuit are being studied in order to compare the noise present. The following data have been obtained:

Circuit Design	Noise Observed				
1	19	20	19	30	8
2	80	61	73	56	80
3	47	26	25	35	50
4	95	46	83	78	97

- 3.1 Use Duncan to estimate the components of the appropriate model for this problem. Estimate all possible differences between pairs of treatments. Are these treatment differences uniquely estimated? If so, why?

ชื่อ _____ สกุล _____ รหัสนักศึกษา _____ ภาควิชา _____ ชั้นปี _____

3.2 Which circuit design would you select for use? Low noise is best.