PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Mid-term Examination: Semester 2   Academic Year: 2004
Date: December, 25, 2004   Time: 9.00-12.00
Subject: 225-346 Work Study   Room: R 300

Instructions

- There are 9 questions (plus 2 extra questions)
- Answer all questions.
- Dictionary, calculators, books and lecture-notes are allowed.
- Total score is 100 (plus 5 extra points).
- Show all your works

ด้วยเกียรติและศักดิ์ศรี ข้าพเจ้าจะซื่อสัตย์ในการสอบ

ลงชื่อ...

<u>ทุจริตในการสอบโทษขั้นต่ำคือปรับตกในรายวิชาที่ทุจริต และพัก</u>

<u>การเรียน 1 ภาคการศึกษา</u>

Good luck
Sakesun Suthummanon

1. How is time study and method engineering related? (3 points)
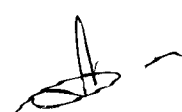
2. How does the flow process chart differ from the operation process chart? (3 points)

3. When is it advisable to construct a man machine chart? (3 points)

4. How does the gang process chart differ from the man machine chart? (3 points)

5. Why is it necessary to construct process charts from direct observation, as opposed to information obtained from the foreman? (3 points)

6. For the lab assignment #2 and #3, you have already visited the PSU post office and observe a serviced provided. Describe the changes that your group recommended for providing the services. (10 points)

     Note: You do not need to show any chart or diagram.

7. For the lab assignment #2 and #3, you have already visited the PSU Petrol station to observe their services. Prepare process chart and flow diagram for the full service for both:
   1. present method
   2. improved method
   (15 points)

FLOW PROCESS CHART

JOB...
....

CHART BEGINS...................................
CHART ENDS.....................................
CHARTED BY.....................................
DATE...
CHART NO...........SHEET NO. ....OF....
WORK PLACE.....................................
OPERATOR ....
CHART TYPE ☐ MAN ☐ MATERIAL
           ☐ EQUIPMENT

SUMMARY

	NUMBER	TIME/DIST
○ OPERATION		
⇨ TRANSPORTATION		
☐ INSPECTION		
D DELAY		
▽ STORAGE		

☐ PRESENT METHOD
☐ PROPOSED METHOD

Dist (m)	Time (Min)	Chart Symbols	Description	Notes
		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
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		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
		TOTAL		

FLOW PROCESS CHART

JOB..

....

CHART BEGINS................................

CHART ENDS..................................

CHARTED BY..................................

DATE...

CHART NO...........SHEET NO. ....OF....

WORK PLACE..................................

OPERATOR ....

CHART TYPE ☐ MAN ☐ MATERIAL
⠀⠀⠀⠀⠀⠀⠀⠀⠀☐ EQUIPMENT

SUMMARY

		NUMBER	TIME/DIST
○	OPERATION		
⇨	TRANSPORTATION		
☐	INSPECTION		
D	DELAY		
▽	STORAGE		

☐ PRESENT METHOD
☐ PROPOSED METHOD

Dist (m)	Time (Min)	Chart Symbols	Description	Notes
		○ ⇨ ☐ D ▽		
		○ ⇨ ☐ D ▽		
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		○ ⇨ ☐ D ▽		
		TOTAL		

8. Assume that the man-machine situation for a food company is presented in figure 1 (Plan A) and figure 2 (Plan B). The relevant costs are:

Operator's wage	=	$6 per hour
Helper's wage	=	$3.50 per hour
Machine A's cost	=	$10.00 per hour
Machine B's cost	=	$14.50 per hour
Price of product	=	$3.00 per piece

Under this circumstance, which plan should be selected? (30 points)

Time	Operator	Machine
2	Make ready 1st unit	Idle
4		Working 1st unit
6	Idle	
8	Put away 1st unit	Idle
10	Make ready 2nd unit	
12		Working 2nd unit
14	Idle	
16	Put away 2nd unit	Idle

Figure 1. Man – Machine Chart- Machine A, Plan A

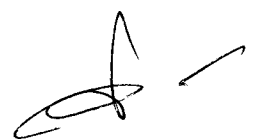| Time	Operator	Machine	Helper
2	Make ready 1st unit	Idle	
4		Working 1st unit	Idle
6	Idle		
8	Make ready 2nd unit	Idle	Put away 1st unit
10		Working 2nd unit	Idle
12	Idle		
14	Make ready 3rd unit	Idle	Put away 2nd unit
16	Idle	Working 3rd unit	Idle

Figure 2. Man – Machine Chart- Machine B, Plan B

9. How many machines should be assigned to an operator when:
    1. Loading time on one machine is 0.5 minute
    2. Walking time between machine is 0.5 minute
    3. Machine time is 3 minutes
    4. Unloading time is 0.5 minute
    5. Operator rate is $10.00 per hour
    6. Machine rate is $50.00 per hour
    7. Product price is $5.00 per piece

    (30 points)

Name…………………………………..Code…………………..Section……….

	Man	M/C1
0.5		
1		
1.5		
2		
2.5		
3		
3.5		
4		
4.5		
5		
5.5		
6		
6.5		
7		
7.5		
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10.5		
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18		
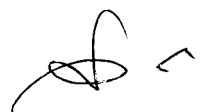
	Man	M/C1	M/C2
0.5			
1			
1.5			
2			
2.5			
3			
3.5			
4			
4.5			
5			
5.5			
6			
6.5			
7			
7.5			
8			
8.5			
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9.5			
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10.5			
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11.5			
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13.5			
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14.5			
15			
15.5			
16			
16.5			
17			
17.5			
18			

Name…………………………………………..Code…………………..Section……….

	Man	M/C1	M/C2	M/C3
0.5				
1				
1.5				
2				
2.5				
3				
3.5				
4				
4.5				
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17.5				
18				

Name…………………………………………..Code…………………..Section……….

	Man	M/C1	M/C2	M/C3	M/C4
0.5					
1					
1.5					
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Name...Code.....................Section..........

Extra credit A (1 point): What is the official name of the room where we have 225-346 lab?

Extra credit B (4 points): List all the equipments you used for the recent lab.