

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination : Semester II

Academic Year : 2008

Date : 19 February, 2009

Time : 09:00 - 12:00

Subject : 225 - 344 Work Study and Productivity Improvement

Room : Robot

ทูลจริตในการสอบ โทษจันด้าปรับตคในรายวิชานัน และพัคการเรียน 1 ภาคการศึกษา

Directions:

1. Lecture notes, textbooks, electronic handheld calculator and dictionary are permitted.
2. You have to fill your name, surname, and ID on this page and fill only your name on the top right of the other pages.
3. You can use pencil to do the exam but do not use "HB" pencil (2B is preferred).
4. The total score = 35 points.

(Thai letters)

First name Mr./Miss Last name

Student ID

Score

Question no.	points	Your points
1	3	
2	12	
3	3	
4	8	
5	6	
6	3	
	35	

Asst. Prof. Charoen Jaitwijitra



1. The Southern Toy Company provides a 5% personal allowance, 5% fatigue, and 2% of special allowance for operations. A work sampling study of one operator over an 8-hour shift yields the data in the table. Average rated performance is 105%. The production output = 60 units per 8 hours.

Load	
Unload	
Clean and services	
Idle	

1.1. What is the **observed time** in minutes per unit for loading?

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1.2. What is the **normal time** in minutes per unit for unloading?

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1.3. What is the **overall standard time** in minutes per unit? (Idle time is not included.)

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2. Complete the following time study and calculate total standard time. Time unit for W and OT is 1/100 minutes while NT is 1/1000 minutes.

Cycle	1	101		31	313	110	111	30	330	115	140	29	334
	2	108	170	30	324	120	199	29	348	110	228	29	319
	3	95	264	36	342	100	290	26	260	110	321	31	341
	4	120	354	33	396	110	380	26	286	125	407	27	338
	5	100	443	36	360	100	467	24	240	105	495	28	294

Total OT	1.66		
Rating			
Total NT			
No. Observations	5	5	5
Average NT		0.2928	0.3252
% Allowance			14%
Elemental Std. Time	0.389	0.328	
Total Standard Time			

$ST = NT + NT(\text{allowances})$

Finishing Time	8:00 น.
Starting Time	8:05 น.
Elapsed Time	5
TEBS	0.5 นาที
TEAF	0 นาที
Total Check Time	
Effective Time	4.45
Ineffective Time	0
Total Recording Time	4.95
Unaccounted Time	0.05
Recording Error	

This time affect the OT of element 1 in cycle 1

3. Work Sampling is to be used to measure the down time of a group of punch press machine. A preliminary study shows that the down time is likely to be around 22%. Determine the number of observations required for this study, for 97% confidence level and a desired accuracy of $\pm 4.5\%$. Use the formula in solving problem.

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4.2. Compute the mean time interval for element 2. (Student t distribution is required to compute them.)

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5. The following data resulted from a time study taken on a horizontal milling machine:

- Mean manual effort time per cycle: 4.62 minutes.
- Mean cutting time (automatically feed): 3.74 minutes.
- Performance rating: 115 percent. (อย่าลืมว่าการประเมินสมรรถนะ จะประเมินเฉพาะงานที่คนทำเท่านั้น)
- Fatigue allowance: 12 percent. (Machine has no fatigue)
- Machine allowance: 5%

What is the standard time for this operation? (แยกคำนวณเวลาคนทำกับเครื่องทำ แล้วค่อยนำมารวมกัน)

ใช้สูตร $Standard\ time = Normal\ time \left(\frac{100}{100 - allowance} \right)$

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ชื่อไทย(ห้ามกรอกรหัส).....

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6. Answer the following questions:

6.1. What is the different meaning between “Qualified worker” and “Representative worker”?

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6.2. What is the meaning of “Intensive sampling”?

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