

PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Final Examination : Semester II

Academic Year : 2006

Date : February 27, 2007

Time : 1:30 - 4:30 PM

Subject : 225 - 346 Work Study

Room : A400

ทฤษฎีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา

Directions:

1. Lecture notes, textbooks, electronic handheld calculator and dictionary are permitted to lead into examination room.
2. ALL questions are required your answers.
3. 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.
4. Pencil is allowed for writing answers.
5. The total score is 30.

First name Mr./Miss Last name

Student ID

Score (fills by lecturer)

Question no.	points	Your points
1	5	
2	5	
3	7	
4	3	
5	10	
	30	

The examination papers are prepared by Asst. Prof. Charoen Jaitwijitra

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Name

1. (5 points) Choose the answers from the following table and place them in the blanks of each question from question number 1.1 to 1.10. The same answer can be used more than once, or none may apply (then write "N/A" in the blank of that question).

Effective time	Ineffective time	Check time
Normal time	Standard time	Observed time
Policy allowance	Watch time	TEAF
Foreign element	Variable fatigue allowance	Qualified
Representative	Governing element	Recording error
Personal need allowance	Variable element	Performance rating

- 1.1. Time added for workers so as to wash hands is called
- 1.2. The normal time which is included allowances is called
- 1.3. Operator selected for a time study should be person.
- 1.4. Sum of observed times =
- 1.5. Observed time multiplied by performance rating =
- 1.6. An element which requires time to be done depending on sizes or areas of item is called
- 1.7. The sum of the time elapsed be for start and the time elapsed after finish is
- 1.8. Allowance to provide a satisfactory level of earnings for a specified level of performance for exceptional circumstances
- 1.9. The elemental time obtained either directly or by subtracting successive watch time.
- 1.10. Unaccounted time divided by elapsed time =
2. The Songkhla municipality had to know how many hours per day that the elevator, which is used to transport tourists to the "Kao Tang Kuan" hill, is worked. The Engineer who was assigned to do this job used the work sampling technique to discover the problem. He went to observe the elevator randomly for 5 days with 24 trips a day. The daily working hour is from 8:00 am to 5:00 pm or nine hours a day. The results is as the following :

Working = 87 times
Wait for tourists (not working) = 33 times



2.1. (2 points) Compute the daily working hours.

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2.2. (3 points) If 98 percent of confidence level and 7 percent desired relative accuracy is required, compute the number of observations.

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3. (7 points) The work measurement analyst wants to develop an accurate equation for estimating the cutting of various configurations in sheet metal with a band saw. The data from eight time studies for the actual cutting element provided the following information :

No.	lineal inches	Standard time
1	10	0.40
2	42	0.80
3	13	0.54
4	35	0.71
5	20	0.55
6	32	0.66
7	22	0.60
8	27	0.61

Construct the equation using the least square technique.

Name

5. (10 points) The following man-machine chart shows the steps of copying documents with a mimeograph machine (เครื่องโรเนียวเอกสาร).

Observed time (Minutes)	Operator	Machine
0.25	Grasps and moves a sheet of manuscript to machine, opens the cover, and positions it to machine. Press button to starts machine.	Idle
0.50	Grasps and moves the 100-copied sheets which are just to be done by machine from table A to table B.	Working
1.10	Waits for machine to copy 100 sheets. (Idle)	
0.10	Grasps and moves the 100-copied sheets which are just to be done by machine to table A.	Idle
0.10	Opens machine cover, grasps the manuscript and moves to it original place	

During running machine there are two occasional elements;

- The operator loads new papers into machine. An average time per 100 copies is 0.12 minutes.
- The operator refills ink to machine. This requires an average 0.08 minutes per 100 copies.

The Westinghouse performance rating is 0.10.

The fatigue allowances and personal allowance are 7% and 5% respectively.

Compute standard time per 100 copies.

Hint:

- Performance rating is used for the operator only. Do not apply for machine working time.

