Final Examination : Semester II

Academic Year : 2005

Date : March 5, 2006

Time : 1:30 – 4:30 p.m.

Subject : 225 - 702 Modern Production Management

Room : R201

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา

Directions:

1. Such materials as lecture notes, textbooks, handheld calculator, and dictionary are permitted to lead into examination room :-
2. This exam composes of nine pages with six questions. You have to answer ALL questions.
3. You have to fill your name and ID on this page and on the top right of the remainder.
4. Total score is 25.

First name Mr. / Ms. .... Last name ....

Student ID ....

Score (will be filled by lecturer)

Q	points	gain
1	3	
2	5	
3	4	
4	3	
5	5	
6	5	
	25	

This test is prepared by Asst. Prof. Charoen Jaitwijitra

1. (3 points)Productivity can be measured in a variety of ways, such as by labor, capital, energy, material usage, and so on. At Modern Lumber, inc., Mr. Sakchai, president and producer of orange crates sold to growers, has been able, with his current equipment, to produce 240 crates per 100 logs. He currently purchases 100 logs per day, and each log requires 3 labor-hours to process. He believes that he can hire a professional buyer who can buy a better-quality log at the same cost. If this is the case, he can increase his production to 260 crates per 100 logs. His labor-hours will increase by 8 hours per day.

What will be the impact on productivity (measured in crates per labor-hour) if the buyer is hired?

(Hint: compare current labor productivity, with no professional buyer, and labor productivity if he hires the buyer)

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2. A bank officer counts ^{out} 10,000 Baht in denominations of five 1,000 Baht bills, six 500 Baht bills, and twenty 100 Baht bills. The purpose of this operation is to supply these bank notes in automatic teller machines (ATM). If the banker have to count out for many cycles and suppose a continuous stopwatch time study yielded the following data (the times are in minutes):

Element	Cycle no.								Performance Rating (%)
	1	2	3	4	5	6	7	8	
1. Counts of 5 bills of 1,000 Baht	.12	.66	1.24	1.95	3.26	3.91	4.52	5.05	110
2. Counts of 6 bills of 500 Baht	.27	.84	1.40	2.12	3.41	4.08	4.66	5.21	115
3. Counts of 20 bills of 100 Baht	.38	.96	1.51	2.20	3.52	4.18	4.74	5.29	105
4. Wraps	.56	1.09	1.80	2.41	3.80	4.36	4.94	5.48	110
5. Drops into chute	-	-	-	3.13[a]	-	-	-	-	90

Remarks

a = Occurs once every 10 cycles.

The allowances for this job are at 15% of the workday (8 hours.)

2.1. (2 points) Calculate the average and normal times, then fill them in the blanks of the following table: (Notice that the times shown above are **cumulative** time)

Element	Average Time	Performance Rating	Normal Time
1. Counts of 5 bills of 1,000 Baht		110	
2. Counts of 6 bills of 500 Baht		115	
3. Counts of 20 bills of 100 Baht		105	
4. Wraps		110	
5. Drops into chute		90	

2.2. (2 points) Calculate the total standard time per cycle.

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2.3. (1 points) What is the standard output in term of 10,000 - Baht bundles/hour?

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3. Use the following information for creating multiple activity chart :

An operator is sitting on chair and working with a microcomputer. He wants to copy a movie into a DVD-R disk. The microcomputer has being powered on.

The operator starts his job by pressing the DVD drive button (time spent for 1 second) and the tray of the drive is ejected (2 seconds are required after pressing the button). Then he grasps a DVD disk and places it into the tray and presses the button again (this activity requires 3 seconds) in order to close the tray (2 seconds are required after the button is pressed). After that the disk will be verified automatically for 5 seconds. As the computer is verifying the disk, the operator will idle until the computer is finished from its task. When the disk is completely verified, the user needs 10 seconds for entering a series of commands to computer. After that the computer burns (writes) data into disk and the disk will be slid out automatically after it is burned (this operation requires 5 seconds). Then the operator grasps the disk from tray and presses button (this requires 3 seconds). After pressing the button, the tray is slid back (closed) into its original position (2 seconds).

After finishing from recording the data on multiple activity chart (appear on next page), you have to answer the following questions. (1 points)

Cycle Time   =   ……………………….   Seconds

Computer Utilization   =   ……………………….   Percent

Name ………………………………..

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Multiple - activity chart

Seconds	Operator			Computer	Seconds
1					1
2					2
3					3
4					4
5					5
6					6
7					7
8					8
9					9
10					10
11					11
12					12
13					13
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15					15
16					16
17					17
18					18
19					19
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31					31
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38					38
39					39
40					40

(3 points)

4. Complete the two-handed process chart by using information from fig. 1 and 2.

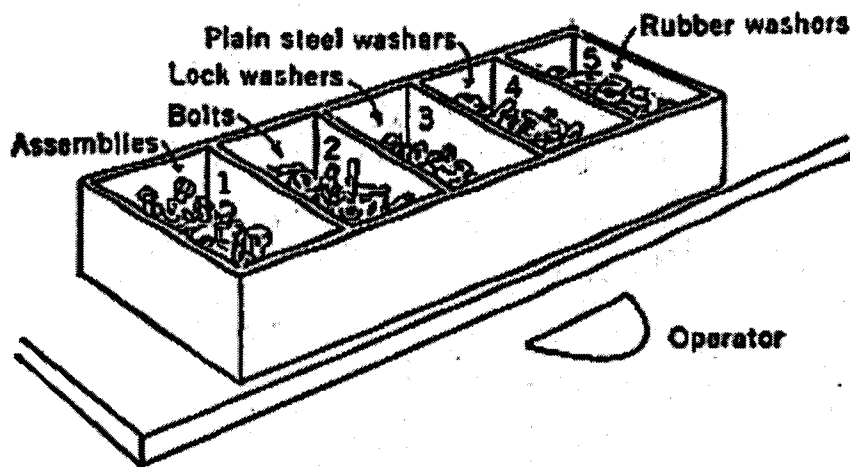Fig. 1 Bolt and washer assembly : A, rubber washer; B, plain steel washer; C, lock washer; D, bolt

Fig. 2 Workplace layout

Name ……………………………..

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Two-handed process chart: Assembles bolt and washers

Left-hand description	O	⇨	D	▽	O	⇨	D	▽	Right-hand description
Carries finished assembly to bin 1									Reaches for lock washer in bin 3
Releases assembly into bin 1									Grasps lock washer from bin 3
Reaches for bolt in bin 2									Carries lock washer to central position
grasps bolt from bin 2									
Carries bolt to central position									Positions lock washer
Holds bolt									Assembles lock washer onto bolt
Holds bolt									Reaches for plain steel washer in bin 4
Holds bolt									Grasps steel washer from bin 4
Holds bolt									Carries steel washer to bolt
Holds bolt									Positions steel washer
Holds bolt									Assembles steel washer
Holds bolt									Reaches for rubber washer in bin 5
Holds bolt									Grasps rubber washer from bin 5
Holds bolt									Carries rubber washer to bolt
Holds bolt									Positions rubber washer
Holds bolt									Assembles rubber washer
Carries finished assembly to bin 1									Releases finished assembly

(3 points)

5. (5 points) If the standard deviation of population is 0.05 minutes and the sample mean is 1.10 minutes, determine the upper and lower limits of true mean (μ) when the 99 per cent confidence interval is required. The normal distribution is assumed and number of observations = 50.

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6. The following table is the Ranked positional weight task listing for an assembly line operation.

Element	RPW	Element time (minutes)	Immediate Predecessor(s)
1	5.31	0.22	-
2	4.39	0.42	1
3	3.77	0.70	1
4	3.07	0.48	2,3
5	2.47	0.63	3,5
6	2.40	0.38	1,3
7	2.02	0.52	4
8	1.50	0.80	7,8
9	1.16	0.12	5
10	1.04	0.34	6,7
11	0.70	0.70	9,10

6.1. (3 points) Assign the tasks to workstations if the specified cycle time is 1 minute.

Workstation	Element

6.2. (2 points) How many units of finished product could be produced per day when the maximum assigned workstation time in problem 6.1 is used? This assembly line is run from 8 a.m. to 5 p.m. with one hour at noon for organization rest period.

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