PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Final Term Examination : Semester I   **Academic Year :** 2007

Date : October 4, 2007.   **Time :** 19:30 - 16:30

Subject : 225-351 Production Planning and Control   **Room :** R300

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
และพักการเรียน 1 ภาคการศึกษา

PART A

Instructions :

1. **There are 3 questions; 60 points.**
2. **Attempt all questions.**
3. **A sheet of paper note at size A4, a dictionary, and a calculator are allowed.**
4. **Borrowing things from other students is prohibited.**

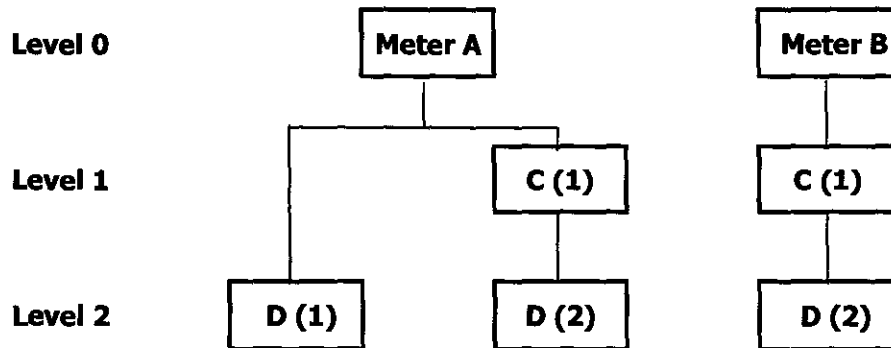| Problem no.	Full Score	Score
1	20	
2	10	
3	30	
Total	60	

Assoc. Prof. Dr. Sunchai Klinpikul
Instructor

1. A master production schedule for water-flow meter type A and B is given as :

	week						
	5	**6**	**7**	**8**	**9**	**10**	**11**
Meter A							**1250**
Meter B				**470**			

Product Structure for meter A and B (BOM) is

Level 0 — Meter A   Meter B

Level 1 — C (1)   C (1)

Level 2 — D (1)   D (2)   D (2)

Lead Time to order part D is 2 weeks, processing time to produce C is 1 week and processing time to assemble both meter A and B is also 1 week.

Develop an MRP schedule for this company.   (20 points)

2. A PM mechanic in a canned food company had observed the operations of a seamer for 3 days and the data is given below.

Observations

Day	Time	Operate	Breakdown and Repair	Set-up
1	0800-0950	✓	-	-
	0950-1020	-	✓	-
	1020-1350	✓	-	-
	1350-1400	-	-	✓
	1400-1700	✓	-	-
2	0800-0830	-	-	✓
	0830-1200	✓	-	-
	1200-1300	-	✓	-
	1300-1500	✓	-	-
	1500-1530	-	✓	-
	1530-1700	✓	-	-
3	0800-1200	✓	-	-
	1200-1300	-	-	✓
	1300-1700	✓	-	-

Determine MA, MTBF, and MTTR of the seamer based on this data.

(10 points)

3. A bakery shop produces hamburgers and sandwiches with the following selling prices :

	฿/pcs
Hamburger	**99.00**
Sandwich	**55.00**

Raw materials for each product are listed as :

<u>Hamburger</u>				<u>Sandwich</u>		
<u>Item</u>	<u>Amount</u>	<u>Cost (฿/unit)</u>		<u>Item</u>	<u>Amount</u>	<u>Cost (฿/unit)</u>
Bread	4 pcs	2.30 per pc		Bread	2 pcs	2.30 ฿/pc
Butter	70 gm	35.00 ฿/kg		Magarine	40 gm	40.00 ฿/kg
Beef	150 gm	50.00 ฿/kg		Chicken meat	250 gm	50.00 ฿/kg
Tomato sauce	20 gm	40.00 ฿/kg		Mayonnaise	50 gm	32.00 ฿/kg
Vegetable	70 gm	25.00 ฿/kg		Vegetable	60 gm	25.00 ฿/kg
Tomato Slices	100 gm	20.00 ฿/kg		Packaging mat.	1	2.00 ฿/pc
Packaging mat.	1	37.00 ฿/pc				

The other costs and expenses are given as :

Labor Cost	=	456	Baht per day
Administrative cost	=	15,000	Baht per month
Electricity	=	2,700	Baht per month
Water	=	1,500	Baht per month
Maintenance and overhead costs	=	250	Baht per day
Depreciation and Interest	=	2,100	Baht per month

Working days of this shop is 30 days per month.

(a) Develop an information system to calculate sales, total cost, and profit per day.

(15 points)

(b) Suppose one day the shop can produce and sell 300 pieces of hamburger and 700 pieces of sandwich, what is the total cost, gross profit, and gross margin of each product on that day.

(15 points)

Faculty of Engineering

Prince of Songkla University

Final Examination : Semester 1

Academic year 2007 (2550)

Date : October 4 , 2007 (4 ตุลาคม 2550)

Time : 13:30 – 16:30

Subject : 225-351 Production Planning and Control

Room : R300

Part B

1. Total examination has 3 topics, 9 pages, and 40 scores.

2. Do your examination in these papers and return all of them.

3. Write down your name, last name, student code in every page.

4. Show all calculation, and assumption. They are very important.

	Score	Your Scores
1	13	
2	13	
3	14	
Total	40	

No...

(From the number in examination)
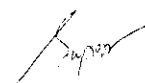
Name..

Last name..

Student Code...

Year / Department..

Assistant Professor Yodduang Pannara
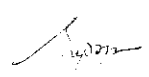
Name…………………..……….Surname………………………….Student code……………..………..

1. From the topic of project management with CPM

    1.1. Write down the arrow diagram from the data below.

Activity A	starts the project.
Activity A	starts before activity B, C, D, E
Activity B	starts before activity F, G
Activity C, D, E	start before activity G
Activity E	starts before activity H
Activity F, G, H	start before activity I
Activity I	is the final activity.

(7 scores)

Name…………………..……….Surname…………………………….Student code……………………..

1.2.   CPM Network in figure 1.2.1 and 1.2.2 correct or not.

-       if it is correct, you must write down that it is correct.

-       if it is not correct or unsuitable, you must adjust or correct it.

-       if you don' t write anything, your score is zero.

1.2.1
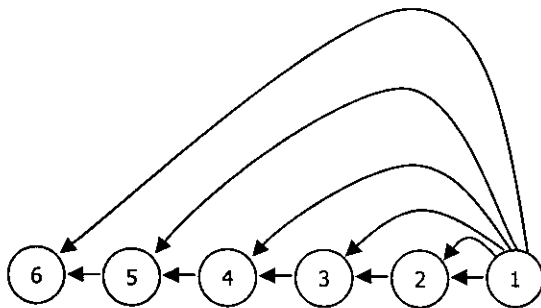
Figure 1.2.1   (3 scores)

1.2.2
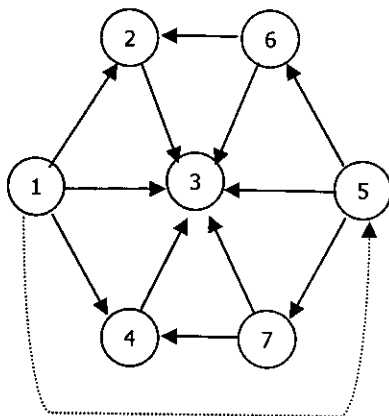
Figure 1.2.2

(3 scores)

(Total 13 Scores)

Name..............................Surname................................Student code...........................

2. From the topic of project management with CPM.

   From CPM Network in figure 2.1, the number in each part or activity is time (days).

   For example, the time from node ① to node ② is 7 days.

Figure 2.1

Name...........................Surname..............................Student code...........................

2.1   What is the meaning and benefit of critical path?   (2 scores)

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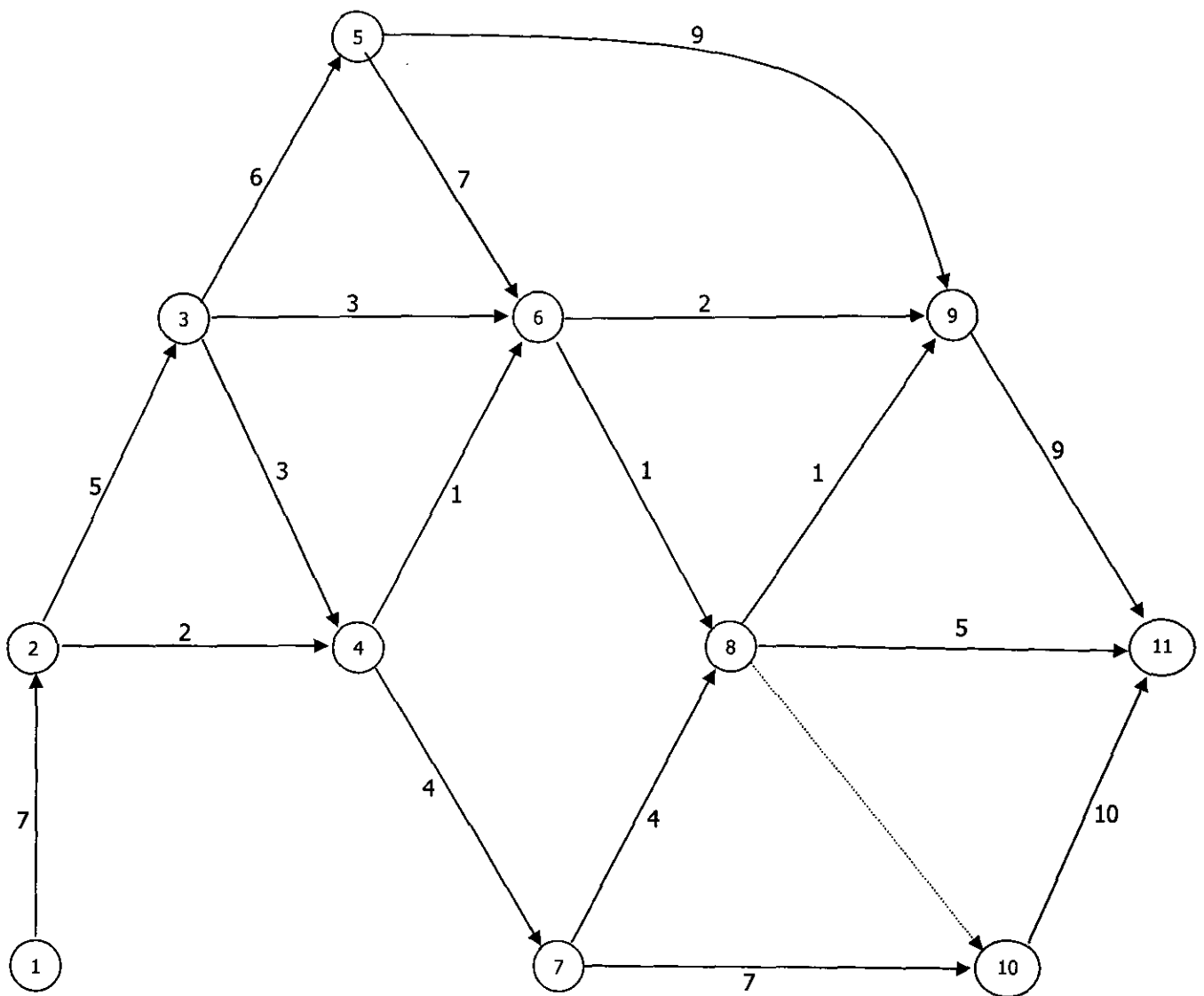...

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2.2   Which paths are the critical part ? Show all of them. (3 scores)

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2.3   What is the value of the critical part ? (1 score)

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2.4.   For every activity calculates (Show all calculation in figure 2.1)
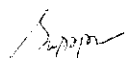
- Earliest Start (ES)

- Latest Start (LS)

- Earliest Finish (EF)

- Latest Finish (LF)

- Total Float (TF)

(5 scores)

2.5.   For every node calculates (Show all calculation in figure 2.1)

- Earliest Event Occurrent Time (EO)

- Latest Event Occurrent Time (LO)

(2 scores)

(Remarks : You must show the data from 2.4 and 2.5 in figure 2.1)   (Total 13 scores)

Name................................Surname................................Student code...........................

3. The factory has one system machine. The factory receives the orders below.

Job	1	2	3	4	5	6	7
Working time (Days)	40	22	30	14	21	39	18
Weight	2	2	3	2	1	3	1
Priority	3	1	2	1	1	1	2
Priority 3 is maximum and priority 1 is minimum							

3.1. Rearrange the method of working to *minimize* mean flow time ($\overline{F}$) by using graph method.

The machine works for 20 days and breaks down 10 days. After that it works smooth.

(This problem does not concern with weight and priority) (6 scores)

3.1.1. How many days of mean flow time ($\overline{F}$) should it be ?

3.1.2. How many average job in the system ($\overline{J}$) should it be ?

3.1.3. How many methods can you rearrange ?

3.2. Rearrange the method of working to *minimize* weight mean flow time ($\overline{F}w$) with priority.

(You can use graph or calculation method. It depends on your decision) (6 scores)

3.2.1. How many days of weight mean flow time ($\overline{F}w$) with priority should it be ?

3.2.2. How many average value of inventory in the system ($\overline{V}$) should it be ?

3.2.3. How many methods can you rearrange ?

3.3. You concern only *working time and priority*, how many methods do they have to rearrange

the ways of working ? (2 scores)

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Remark : Draw the graph in this paper and specify the scale of each position.

(Total 14 scores)