Name..... ID Code .....

PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Final Examination : Semester I **Academic Year :** 2004

Date : October 1, 2004 **Time :** 09.00-12.00

Subject : 225-353 Production Planning and Control **Room :** R 201

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ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และ
พักการเรียน 1 ภาคการศึกษา โทษสูงสุด ให้ออก

PART A

Instruction :

1. **There are 3 questions, 60 points.**
2. **The student can take notes on a sheet of paper at size A4.**
3. **Borrowing things from other students is prohibited.**
4. **A calculator and a dictionary are allowed.**

Problem	Full Score	Score
1	15	
2	15	
3	30	
Total	60	

Assoc. Prof. Dr. Sunchai Klinpikul

Instructor

Name..... ID Code .....

1. **A past 6-month sales records of a fashion magazine is :**

Month	Jan	Feb	Mar	Apr	May	June
Units	450	700	960	1,500	2,100	2,800

Forecast the demand in July using the forecast function $Y = ae^{bt}$

(15 points)

2. On September 2003, the manager of a company was trying to select a boring machine to process an extra order of 1,000 units. He had two boring machines M_1 and M_2.

Boring machine M_1 has a monthly depreciation cost of $ 1,000 and M_2 has a monthly depreciation of $ 5,000. In addition to these costs, administrative overheads of $ 500 per month on M_1 and $ 300 per month on M_2 were charged. Operating costs on M_1 and M_2 were estimated at $ 0.10, and $ 0.20 per unit respectively.

The company was operating 25 days per month and the order of 1,000 units could be filled in one day by either machine.

Which machine should the manager select to process this order ?

(15 points)

3. A manufacturing company is producing 6 types of products using common machines. The depreciation and overhead costs are 30,000 Baht per month.

Selling prices, variable costs, production time and sales demand in the next month for each product are as follows :

	Product					
	1	2	3	4	5	6
Selling price (Baht/unit)	6.50	8.20	9.40	10.50	12.00	15.00
Variable cost (Baht/unit)	2.50	3.00	4.00	3.50	5.60	3.40
Production Rate (units/hr)	50	30	110	28	40	15
Demand (units/month)	4,500	2,500	3,500	780	3,600	2,000

Suppose the machine available time for the next month is limited at 240 hours.

(a) Formulate a linear programming model for this problem. (15 points)

(b) What is the optimal production plan of the company and what is the maximum profit in the next month ? (15 points)

Faculty of Engineering

Prince of Songkla University

Final Examination : Semester 1 Academic year 2004 (2547)

Date : October 1, 2004 (2547) Time 09:00 – 12:00

Subject : 225 – 353 Production Planning and Control (Part B) Room R 201

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน ภาคการศึกษา โทษสูงสุดให้ออก

Part B

1. Total Examination has 3 Topics , 11 pages , and 40 scores
2. Do your examination in these papers and return all of them
3. Write down your name , surname , student code in all the papers
4. Show all calculation , and assumption

	Scores	Your Scores
1	13	
2	13	
3	14	
Total	40	

Name.....

Surname.....

Student code.....

Year/ Department .....

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

   Activity B, C, D start before activity E, F, G, H

   Activity G, H, start before activity I

   Activity E, F, I start before activity K, L, M, P, Q

   Activity K, L, M, P, Q start before activity R

   Activity R 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.

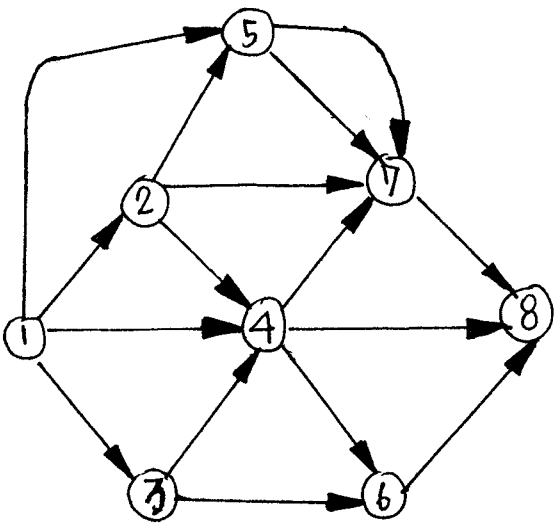

Figure 1.2.1 (3 scores)

1.2.2.

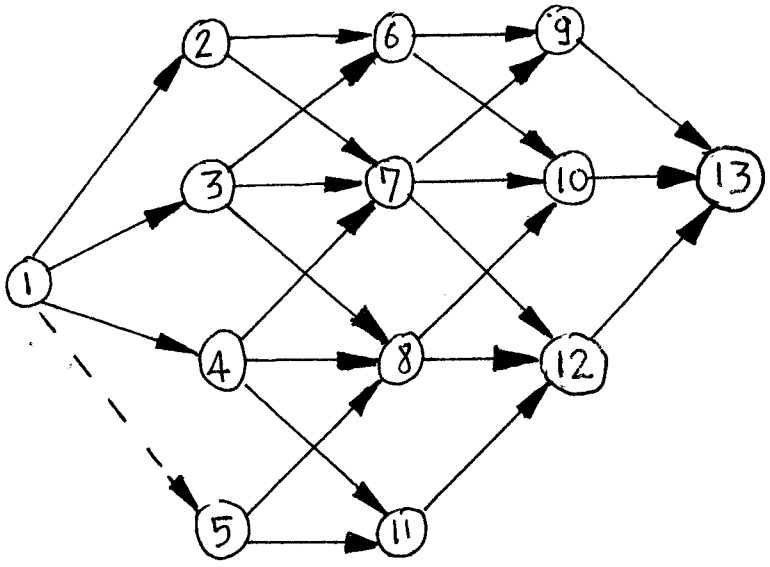

Figure 1.2.2 (3 scores)

(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 path or activity is time (days) .

For example, the working day form model (1) to node (2) is 5 days

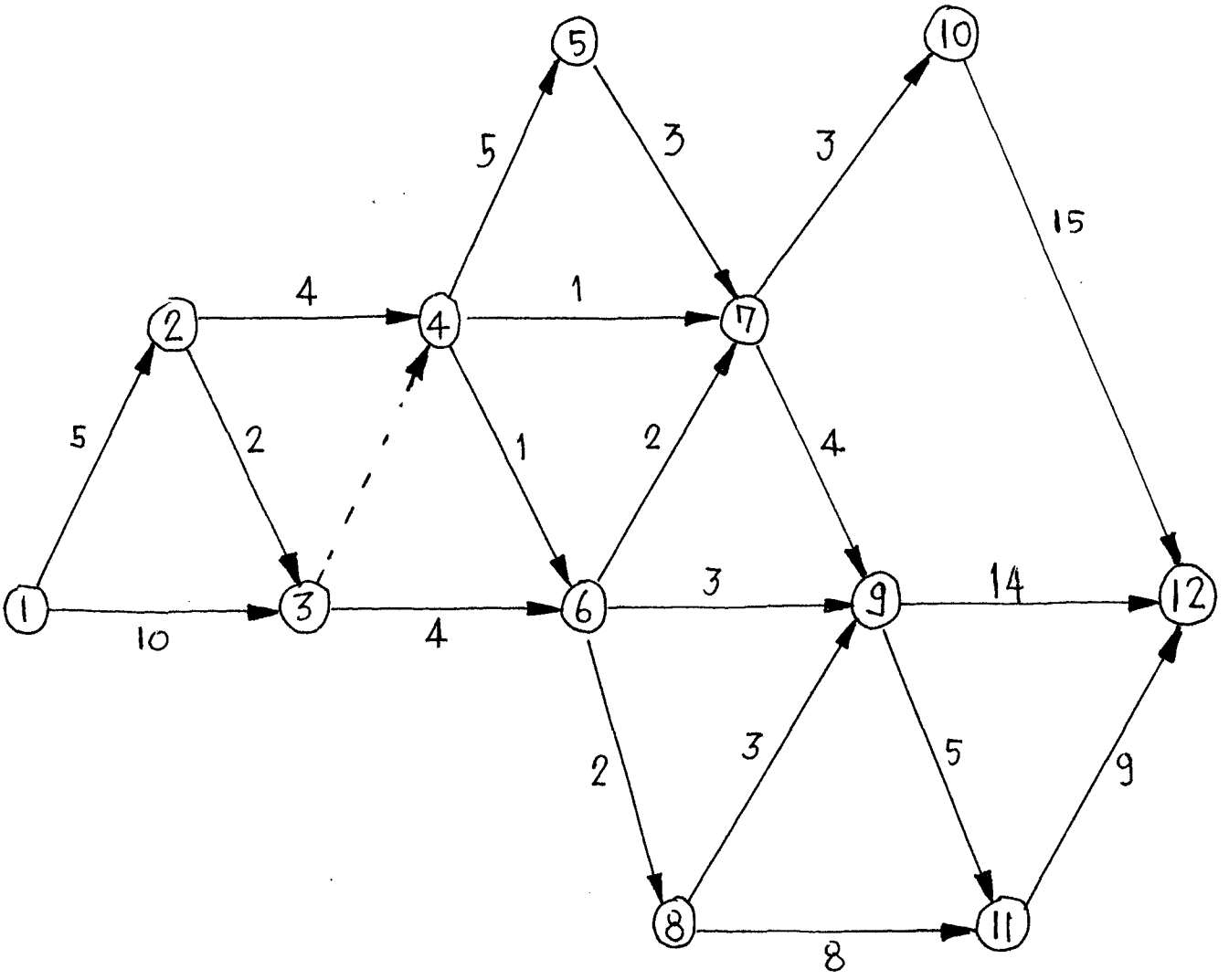

Figure 2.1

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

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2.2. Show all calculation in figure 2.1 For

2.2.1. Which paths are the critical path ? Show all of them (2 scores)

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2.2.2. What is the value of the critical path ? (1 score)

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2.3. For every activity calculates

- Earliest Start (ES)
- Latest Start (LS)
- Earliest Finish (EF)
- Latest Finish (LF)
- Total Float (TF)

(5 scores)

2.4. For every node calculates

- Earliest Event Occurrent Time (EO)
- Latest Event Occurrent Time (LO)

(3 scores)

(Remarks : You must show the data from 2.3 and 2.4 in the table) (Total 13 scores)

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

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

Job	1	2	3	4	5	6	7
Working time (Days)	30	22	21	14	20	36	17
Profit (Baht)	200	200	300	100	100	300	100
Priority	2	1	2	1	1	1	2
Priority 1 is maximum							

3.1. How many methods do they have to rearrange the ways of working ? You must concern only working time and priority in this problem . (Show all calculation) (2 scores)

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3.2. Rearrange the method of working to maximize mean flow time ($\bar{F}$) by using graph method . How many days should it be ? How many average job in the system should it be ? Use graph method for this problem (This problem does not concern with weight and priority) (5 scores)

3.3. Rearrange the method of working to minimize weight mean flow time ($\bar{Fw}$) with priority . How many days should it be ? How many average value of inventory in the system ($\bar{V}$) should it be ? (You can use graph or calculation method . It depends on your decision) (6 scores)

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3.4. Show one example to schedule the job by using LPT (Longest Processing Time) and explain the reason (1 score)

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

(Total 14 scores)

(Assistant Professor Yodduang Pannara)

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

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