PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester 2 **Academic Year:**2009
Date: December 19, 2009 **Time:** ~~9:00-11:00~~ 13.30 - 15.30
Subject: 225-351 Industrial Plant Design **Room:** A401

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ทุจริตในการสอบ โทษขั้นต่ำ คือ พักการเรียน **1** ภาคการศึกษา และปรับตกในรายวิชาที่ทุจริต

Directions:

- There are 7 questions. The total score is 75.
- Write your own answer on your examination sheets.
- All materials, books, calculators are allowed.

Name..... Student ID .....

Question	Full scores	Assigned Scores
1.	4	
2.	6	
3.	20	
4.	10	
5.	10	
6.	10	
7.	15	
Total	75	

Assoc. Prof. Wanida Rattanamanee
Instructor
☺☺☺ Good Luck ☺☺☺

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1. **(4 points)** What is plant design and what is plant layout?

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2. **(6 points)** Explain in detail about plant system design, layout design and material handling design.

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3. **(20 points)** From Figure 1, fill the value of each variable in Table 1. These variables come from Mathematical model for location planning.

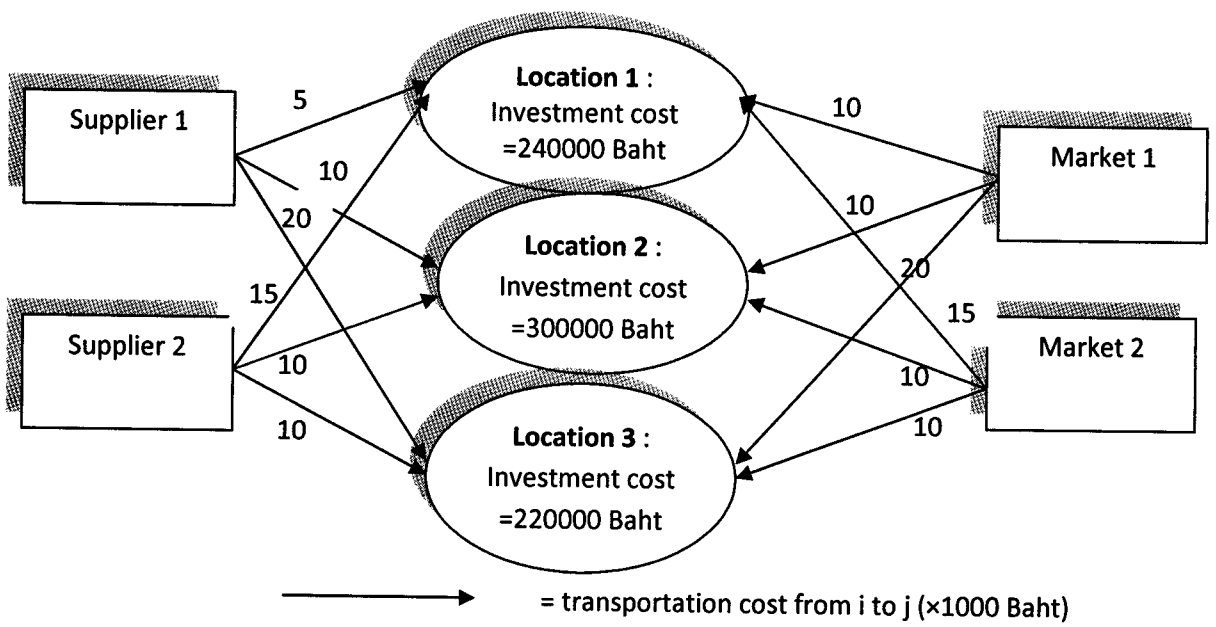

Figure 1

Code.....

Table 1 Problem variables

Variable	Value
m	
n	
Number of C_{ij}	
i	
j	

Variable	Value
F_1	
F_2	
F_3	

List of C_{ij} Value (Fill in the blanks)

C_{11} = ... C_{12} = ... C_{13}= ..... $C_{...}$ = ...

$C_{...}$ = ... $C_{...}$ = ... $C_{...}$ = ... $C_{...}$ = ...

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If location 2 is selected, fill in the blank of these values

X_{11} = ... X_{12} = ... X_{13} = ... X_{21} = ...

X_{22} = ... X_{23} = ... X_{31} = ... X_{32} = ...

X_{33} = ... X_{41} = ... X_{42} = ... X_{43} = ...

Y_1 = ... Y_2 = ... Y_3 = ...

The value of equation 2.1 (in the book) = ... Baht

The best location is ..... because .....

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4. (**10 points**) A newly formed firm must decide on a plant location. There are two alternatives under consideration : locate near the major raw materials or locate near the major customers. Locating near the raw materials will result in lower fixed and variable costs than locating near the market, but the owners believe there would be a loss in sales volume because customers tend to favor local suppliers. Revenue per unit will be $185 in either case. Using the following information, determine which location would produce the greater profit.

	Omaha	**Kansas city**
Annual fixed costs ($millions)	$1.2	$1.4
Variable cost per unit	$36	$47
Expected annual demand (units)	8,000	12,000

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5. (**10 points**) From the following data, determine which location has the highest factor rating.

Factor	Weight	Location		
		A	B	C
Labor Cost	.3	20	20	30
Material Cost	.3	20	10	20
Supplier base	.2	30	10	20
Electricity available	.2	10	30	20

6. (**10 points**) From the following table, what is shown in the table? How is it important for project planning and budgeting?

Preliminary Design 1.1.1	Jan.	Feb.	Mar.	Apr.	May
1.1.1.1 define specifications & Req.	1,500	1,000			
1.1.1.2 develop preliminary design		2,000	2,000		
1.1.1.3 review preliminary design			500	500	
1.1.1.4 incorporate comments				320	320
1.1.1.5 preliminary design complete					1,000

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7. (**15 points**) Give at least one example of product design tool and one example of process design tool.