Student ID .....

PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Midterm Examination : Semester I **Academic Year** : 2008

Date : August 1, 2008 **Time** : 09:00 – 12:00

Subject : 225 - 343 Production Management and Optimization **Room** : A400

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น และพักการเรียน 1 ภาคการศึกษา

Directions

1. The following materials can be led into examination room : lecture notes, textbooks, electronic handheld calculator, and dictionary.
2. Using all kinds of communication equipment such as PDA phone, cellular phone, and notebook computer are prohibit.
3. You have to answers ALL questions.
4. You have to fill your name and ID on this page and fill only ID on the top-right corner of the remaining pages.
5. There are seven pages (this page is included), six problems with 40 points.

First name Mr./Miss ..... Last name .....

Student ID .....

Problem no.	Points	Your scores
1	3	
2	3	
3	6	
4	10	
5	10	
6	8	
	40	

***** Asst. Prof. Charoen Jaitwijitra *****

Student ID .....

Read the problems carefully, and write answers in the specified areas under each problem. Don't forget to answer all questions of each problem.

1. (3 points) What is the meaning of "mass customization"? Describe and show some products (ยกตัวอย่างผลิตภัณฑ์) related to mass customization.

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2. (3 points) "Manufacturing" is come from two words in Latin language: "manus" and "factus".

Manus = ...

Factus = ...

The meaning of "manufacturing" is differing from "production", explain the differences.

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3. (6 points) Data as shown below is the results of forecasting using the Winters' three parameter exponential smoothing technique. Some values are missed and you must find them. The $\alpha = 0.20$, $\gamma = 0.25$, and $\beta = 0.30$. The initial seasonal indices for year 2005 is as follow :

Month	1	2	3	4	5	6	7	8	9	10	11	12
I	0.94	1.14	1.17	1.06	0.96	1.02	1.09	1.11	1.04	0.93	0.79	0.74

Year	Month	X	S_t	b_t	I_t	F_{t+1}	e	|e|	e^2
2005	0		100	0.51	0.94	95.15			
	1	100	102.25	1.48	0.95	97.51	2.49	2.49	6.22
	2	128			1.15				0.67
	3	138	114.37	3.38	1.18	137.97	0.03	0.03	0.00
	4	127	115.69	2.87	1.07	125.77	1.23	1.23	1.52
	5	112	115.74	2.16	0.96	113.24	-1.24	1.24	1.54
	6	115	118.22	2.24	1.01	122.96	-7.96	7.96	63.41
	7	128	121.80	2.58	1.08	135.70	-7.70	7.70	59.26
	8	134	124.34	2.57	1.10	141.05	-7.05	7.05	49.77
	9	130	125.14	2.13		132.62	-2.62	2.62	6.88
	10	116	124.10	1.33	0.93	116.66	-0.66	0.66	0.43
	11	100	121.81	0.43	0.80	96.59	3.41	3.41	11.62
	12	95	121.56	0.26	0.75	90.31	4.69	4.69	21.96
2006	13	125	130.64	2.46	0.95				2.67
	14	148	137.54	3.57	1.13	162.01	-14.01	14.01	196.31
	15	155	140.41	3.40	1.16	170.01	-15.01	15.01	225.27
	16	138	138.87	2.16	1.05	151.17	-13.17	13.17	173.54
	17	128	137.24	1.21	0.95	133.28	-5.28	5.28	27.86
	18	142	140.55	1.74	1.01	143.19	-1.19	1.19	1.42
	19	152	144.00	2.17	1.07	157.70	-5.70	5.70	32.51
	20	156	146.04	2.13	1.09	163.18	-7.18	7.18	51.55
	21	140	144.19	1.14	1.02	151.31	-11.31	11.31	127.91
	22	122	140.19	-0.15	0.91	130.44	-8.44	8.44	71.29
	23	108	135.69	-1.24	0.80	107.48	0.52	0.52	0.27
	24	100	132.61	-1.69	0.75	98.63	1.37	1.37	1.87
2007	25	146	143.48	1.45	0.97	138.12	7.88	7.88	62.11
	26	175	151.94	3.20	1.13	174.75	0.25	0.25	0.06
	27	173	154.62	3.07	1.15	182.71	-9.71	9.71	94.28
	28	161	154.23	2.20	1.05	164.02	-3.02	3.02	9.09
	29	150	153.80	1.55	0.96	148.14	1.86	1.86	3.46
	30	162	158.02	2.21	1.01	161.45	0.55	0.55	0.30
	31	171	161.95	2.64	1.07	176.44	-5.44	5.44	29.57
	32	173	164.10	2.52	1.08	181.85	-8.85	8.85	78.27
	33	168	164.40	1.97	1.02	169.71	-1.71	1.71	2.91
	34	157	163.86	1.34	0.93	150.85	6.15	6.15	37.87
	35	130	160.22	0.09	0.80	127.99	2.01	2.01	4.06
	36	125	159.41	-0.13	0.76	120.03	4.97	4.97	24.67

3.1. S_2 = ... (แทนตัวเลขให้เห็น)

= ..... (คำตอบ)

3.2. b_2 = ... (แทนตัวเลขให้เห็น)

= ..... (คำตอบ)

3.3. F_2 = ... (แทนตัวเลขให้เห็น)

= ..... (คำตอบ)

3.4. I_9 = ... (แทนตัวเลขให้เห็น)

= ..... (คำตอบ)

3.5. F_{13} = ... (แทนตัวเลขให้เห็น)

= ..... (คำตอบ)

3.6. How the b_0 was derived from?

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4. (10 points) Demands for quarter 1 to 4 of a company are 300, 600, 400 and 200 with this pattern repeating in the future as far as you can expect. The company has 80 workers. Each worker can produces 5 units of product per quarter. Inventory costs = 30 baht per unit per quarter. Shortage costs = 100 baht per unit per quarter. Hiring (or layoff) a worker = 1000 baht. Excess labor cost = 1000 baht per worker per quarter. Overtime labor cost = 50 baht per unit. Construct aggregate plan using pure strategy, level production. The plan is starting on the second quarter.

Description	Quarter no.				Total (baht)
Demand					
Production volume					
Inventory (units)					
Inventory cost					
Cumulative shortage units					
Shortage cost					
Overtime					
Overtime cost					
Idle labors					
Idle labor cost					
Hire or layoff					
Hire or layoff cost					
Total cost (baht)					

5. A small business has annual fixed cost 100,000 baht, direct labor is 15 baht per unit of goods, and material is 55 baht per unit. The selling price will be 72 baht per unit.

5.1. (4 points) What is the break-even point in baht?

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5.2. (4 points) If the firm can reduce the material cost to 53 baht per unit, how many percent of break-event point in units can be reduced?

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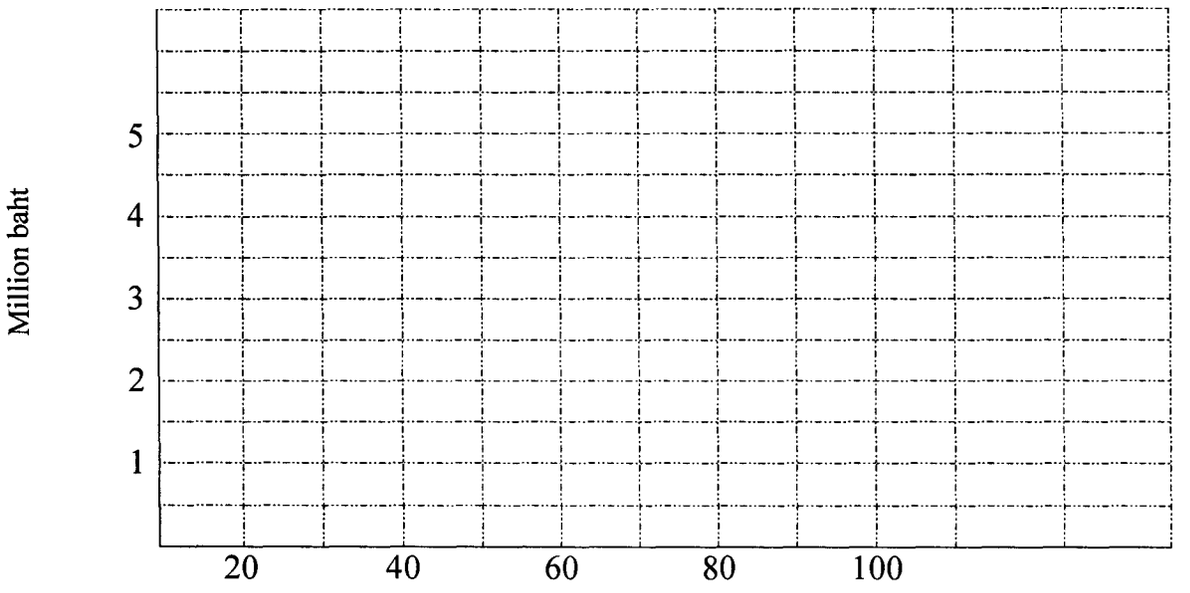
5.3. (2 points) Draw graph of break-even analysis before changing material costs.



6. Getz Product Company is investigating the possibility of producing and marketing *backyard storage sheds*(โรงเก็บของหลังบ้าน). Undertaking this project would require the construction of either a large or a small manufacturing plant. The market for the product produced---storage sheds---could be either favorable or unfavorable. Getz, of course, has the option of not developing the new product line at all. A decision table is shown below.

Alternatives	State of nature	
	Favorable market	Unfavorable market
Construct large plant	2,000,000	-1,800,000
Construct small plant	1,500,000	-500,000
Do nothing	0	0

6.1.(5 points) If the probability of a favorable market is 0.60 and of the unfavorable market is 0.40, what alternative is selected when using the expected value?

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6.2. (3 points) Draw the decision tree and solve this problem.