

Faculty of Engineering  
Prince of Songkla University

Final Examination: Semester 1

Academic Year 2011 (2554)

Date: July 31, 2011 (31 กรกฎาคม 2554)

Time: 09:00 - 12:00

Subject: 225-347 Production Planning and Control

Room : A401

ทฤษฎีในการสอบ โทษชั้นต่ำ ปรับตกในวิชาที่ทฤษฎีนั้น  
และพักการเรียน 1 ภาคการศึกษา

**Instruction**

1. Total examination contains 6 topics, 24 pages, and 74 scores.
2. Do your examination in these papers and return all of them.
3. Write down your Name, Surname, and Student Code in every page.
4. Show all calculation and assumption.
5. All books, notes and calculators are allowed but you are not permitted to borrow anything from the others.
6. All figures are not to scale.
7. Draw the graph in plain paper and the scale should be approximately close to the fact.

|       | Scores | Your Scores |
|-------|--------|-------------|
| 1     | 15     |             |
| 2     | 14     |             |
| 3     | 11     |             |
| 4     | 14     |             |
| 5     | 10     |             |
| 6     | 10     |             |
| Total | 74     |             |

No.....

(From the number in examination list)

Name.....

Surname.....

Student Code.....

Year.....

Department.....

Assistant Professor Yodduang Pannara

c. Production Manager .....

d. Financial Manager.....

Name.....Surname.....Student Code.....

1.3. From figure 1.1, calculate the capacity of the factory and explain the reason (2 Scores)

(Number in rectangular is capacity) (Units/hr.)

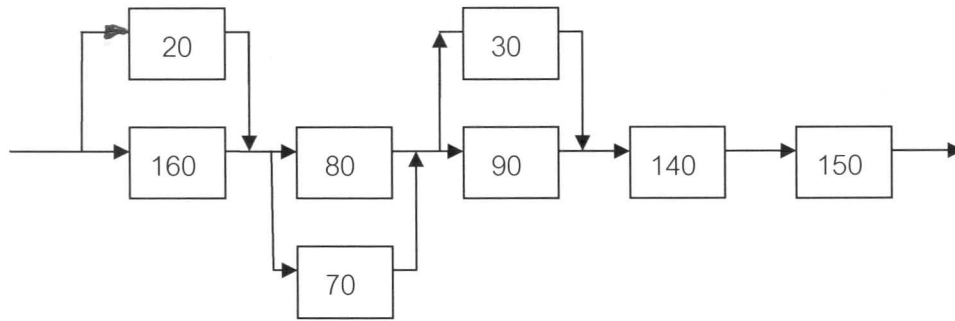


Figure 1.1

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1.4. What are the difference between using  $\alpha = 0.1$  and  $\alpha = 0.7$  to forecast by single exponential smoothing? (2 Scores)

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1.5. Explain the job description of sales and marketing in the company (1 Score)

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Name.....Surname.....Student Code.....

1.6 Product A has Bill of Material (BOM) in figure 1.2

The factory has

- B 20,000 units
- D 7,000 units
- E 6,000 units
- Z 2,790 units

How many pieces of A can you produce.? (3 Scores)

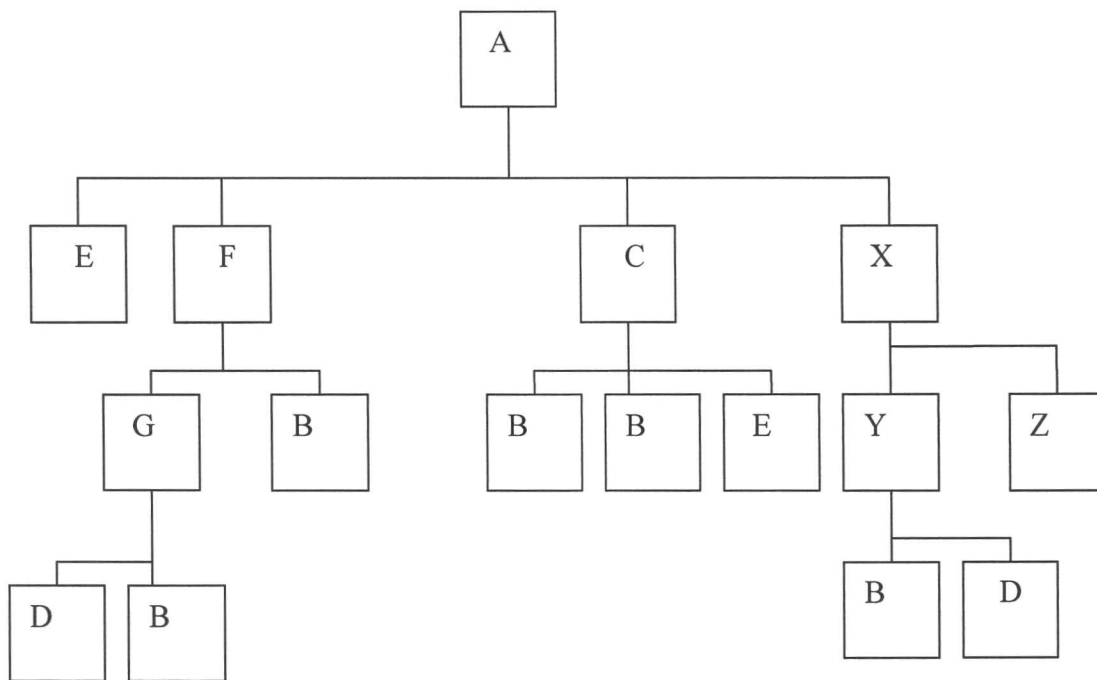


Figure 1.2

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1.7. What is the strength and weakness of two bins inventory system (2 Scores)

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2. The income of Foodtech company is shown here in figure 2.1

| Year | Income (Million Baht) |
|------|-----------------------|
| 2553 | 1390                  |
| 2552 | 1320                  |
| 2551 | 1250                  |
| 2550 | 1230                  |
| 2549 | 1170                  |
| 2548 | 1120                  |

Figure 2.1

- 2.1 Use Single Moving Average ( $N=3$ ) to forecast income in 2554 and calculate MSE and MAD (3 Scores)
- 2.2 Use Single Exponential Smoothing ( $S_0 = 1150$  and  $\alpha = 0.1$ ) to forecast income in 2554 and calculate MSE and MAD (5 Scores)
- 2.3 Use Double Moving Average ( $N=2$ ) to forecast income in 2554 and calculate MSE and MAD (4 Scores)
- 2.4 From 2.1 , 2.2 and 2.3 , what technique do you select for this problem and why? (2 Scores)

Name.....Surname.....Student Code.....

3. DTEC Communication has the income below

| Year | Quarter | Income (Million Baht) |
|------|---------|-----------------------|
| 2553 | 1       | 800                   |
|      | 2       | 500                   |
|      | 3       | 630                   |
|      | 4       | 720                   |
| 2552 | 1       | 700                   |
|      | 2       | 450                   |
|      | 3       | 600                   |
|      | 4       | 670                   |

3.1 Use Winter's Linear and Seasonal Exponential Smoothing ( $\alpha=0.15$ ,  $\gamma=0.1$ ,  $\beta=0.2$ ) to forecast income of each quarter in 2554 and calculate MSE and MAD ( 9 Scores )

3.2 When is the suitable time to use this technique? (2 Scores)

Name.....Surname.....Student Code.....

4. Siamchai company orders 2 products. The data is below

| Product | Sale<br>(Units/year) | Price<br>(Baht/unit) | Quantity<br>discount if<br>order more<br>than this units<br>( units ) | Discount<br>(%) | Ordering<br>Cost<br>(Baht/times) | Holding cost<br>(Baht/baht-yr) |
|---------|----------------------|----------------------|---|-----------------|----------------------------------|--------------------------------|
| 1       | 4500                 | 1000                 | 100   | 3               | 200                              | 0.15                           |
| 2       | 3500                 | 2000                 | 100   | 5               | 170                              | 0.12                           |

Assume inventory is  $Q/2$  and interest rate is 0% per year

- 4.1 Calculate the EOQ for each product (6 Scores)
- 4.2 Suggest the best purchasing plan for each product (2 Scores )
- 4.3 How much is the best total cost for each product ? (6 Scores)

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5. The Pacifica factory produces motors 20,000 units per month and has 15 % defect

The production cost and profit are below

|                   |        |           |
|-------------------|--------|-----------|
| Selling price     | 10,000 | Baht/unit |
| Material cost     | 4,000  | Baht/unit |
| Salary            | 1,500  | Baht/unit |
| Production cost   | 1,800  | Baht/unit |
| Depreciation cost | 1,200  | Baht/unit |
| Profit            | 1,500  | Baht/unit |

The factory works 10 hrs/day and 20 days/month. Demand is 16,000 units/month

5.1. Analyze the profit/loss of the factory for this month (3 Scores)

5.2 Suppose this month the electricity loss 5 hrs. Analyze the profit/loss of the factory for this month ( 3 Scores )

5.3 Suppose this month the machine breaks down 20 hrs. The repair cost is 5,000 baht.

The electricity also loss 10 hrs. Analyze the profit/loss of the factory for this month. (4 Scores)

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6. The welding factory has 3 machines BIG1 , BEST and SOTUS. The capacity of all machines are 2500, 3000, and 4000 units/months respectively. The fixed expense and depreciation cost of BIG1 , BEST and SOTUS are 20,000, 26,000, and 30,000 Baht respectively

Variable cost of BIG 1, BEST and SOTUS are 30,25 and 20 Baht/unit, respectively.

Each month the manager knows demand of customers. He writes down break even analysis in figure 6.1

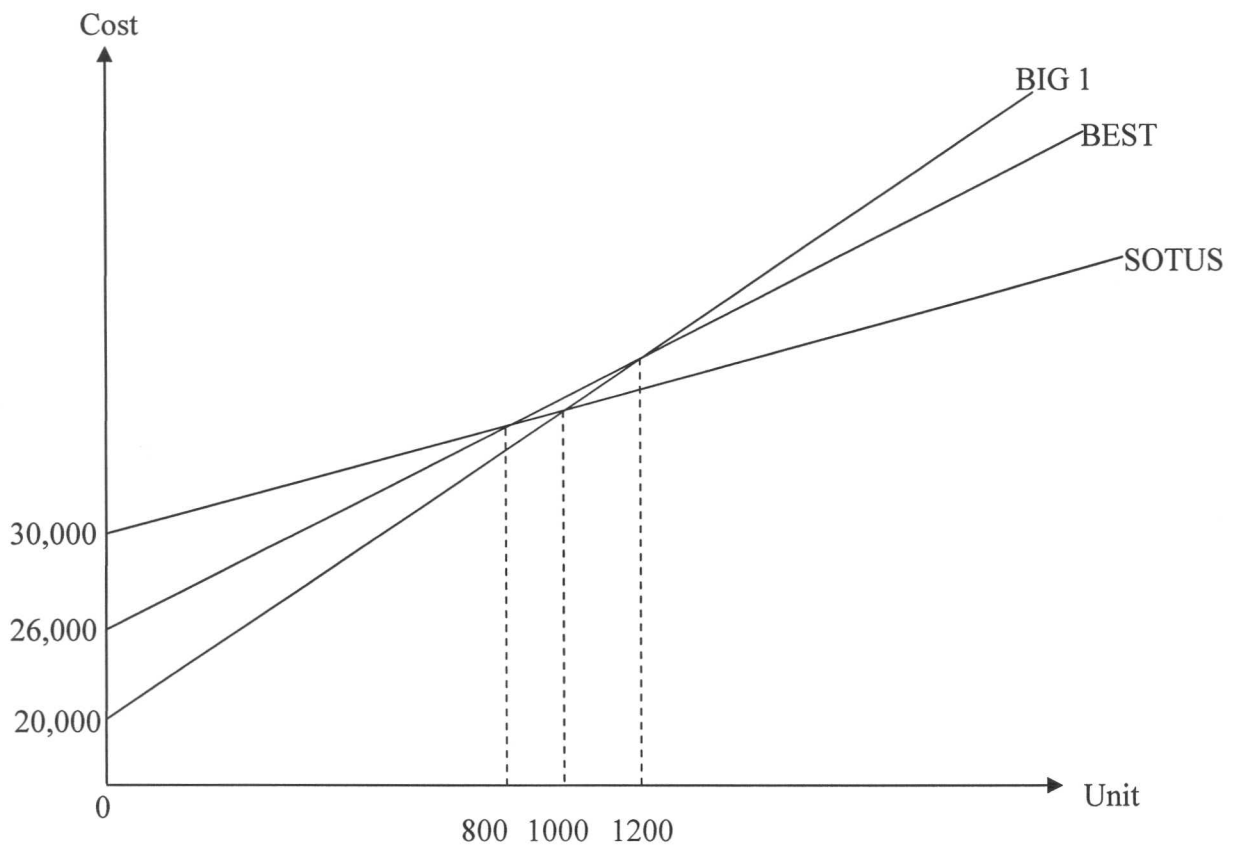


Figure 6.1 ( Not to Scale )

The manager also writes down the production plan. Each month

If the production is less than 1,000 units. he uses BIG1

If the production is equal 1000 units, he can use BIG1 or SOTUS

If the production is more than 1,000 units, he uses SOTUS

What are your ideas about this production plan and break even analysis? Explain or show all calculation clearly (10 Scores)

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