

**PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING**

Mid Term Examination : Semester I**Academic Year : 2008****Date : July 27,2008****Time : 09:00-12:00****Subject : 225-347 Production Planning and Control Room : A401**
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ทฤษฎีในการสอบ โทษชั้นต่ำปรับตกในรายวิชานี้
และพักการเรียน 1 ภาคการศึกษา

Instructions :

1. There are 5 questions, 100 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	20	
3	20	
4	20	
5	20	
Total	100	

**Assoc. Prof. Dr. Sunchai Klinpikul
Instructor**

1. A past sales demand for a period of five months of a product is shown as :

<u>Month</u>	<u>Demand (units)</u>
Jan	108
Feb	109
Mar	122
Apr	130
May	<u>150</u>

(a) Forecast the demand for the next three months using trend extrapolation method and using an exponential function $y = ae^{bt}$

(10 points)

(b) Compute the control charts for these three months using standard deviation method. ($\alpha = 0.05$)

(10 points)

2. The maintenance department of a large hospital uses about 816 cases of liquid cleanser annually. Ordering costs are \$ 12.00, carrying costs are \$ 4.00 per case a year, and the new price schedule indicates that orders of less than 50 cases will cost \$ 20.00 per case, 50 to 79 cases will cost \$ 18.00 per case, 80 to 99 cases will cost \$ 17.00 per case, and larger orders will cost \$ 16.00 per case. Determine the optimal order quantity and the total cost.

(20 points)



3. The manager of the deli section of a grocery superstore has just learned that the department has 112 pounds of mayonnaise, of which 70 pounds is approaching the expiration date and must be used. To use up the mayonnaise, the manager has decided to prepare two items; a ham spread and a deli spread. Each pan of the ham spread will require 1.4 pounds of mayonnaise, and each pan of the deli spread will require 1.0 pound. The manager has received an order for 10 pans of ham spread and 8 pans of the deli spread. In addition, the manager has decided to have at least 10 pans of each spread available for sale.

Both spreads will cost \$ 3.00 per pan to make, but ham spread sells for \$ 5.00 per pan and deli spread sells for \$ 7.00 per pan.

Formulate a linear programming model for this store.

(20 points)



4. BOAT Begery Store is manufacturing popular kind of bread with a daily production of 6,000 loaves. Total processing time is 10 hours per day. However, 15% of them are defective. The unit selling price of a nondefective loaf is \$ 0.40 and daily demand is expected to exceed 6,000 loaves. The defective loaves are delivered to schools and all sold for \$ 0.15 each. The variable cost of producing each loaf is \$ 0.15 while fixed cost is \$ 0.20 per loaf.

(a) One day, they were able to produce only 7 hours because a power stoppage occurred. If the defective rate remained 15%, how much loss might be attributed to this power stoppage ? (The raw materials are assumed to be usable the next day.)

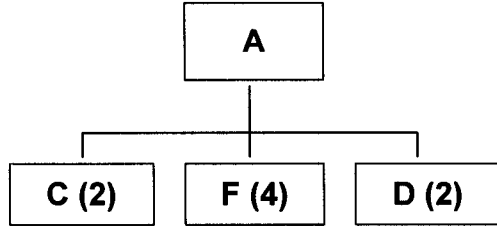
(10 points)

(b) After a few months passed, competitors for that type of bread came into the market. The daily sales amount of nondefective breads declined and stabilized at 4,000 loaves. Assume the defective rate was 15% and the defective loaves were still delivered to schools and sold for \$ 0.15 each. How much loss might be attributed if there was the power stoppage of three hours occurred again ?

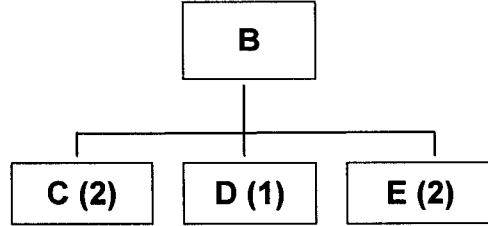
(10 points)

5. Brown Electronics manufactures a line of digital videodisc (DVD) players. Although there are differences among the various products, there are a number of common parts within each player. The bill of materials, showing the number of each item required, EOQ, lead time, and inventory on hand, are listed as follows :

BOM (Model A)



BOM (Model B)



Part	EOQ	Lead Time (weeks)	Inventory on hand
C	80	1	100
D	100	2	60
E	40	1	40
F	200	2	0

The MPS of the product for the next 10 weeks is shown as :

Week	0	1	2	3	4	5	6	7	8	9	10
Model A (units)				40			60			50	
Model B (units)					30			30			40

Develop MRP schedule for the Brown Electronic Company.

(20 points)