

**Faculty of Engineering
Prince of Songkla University**

Midterm Examination : Semester I**Academic Year : 2005****Date : August 3, 2005.****Time : 13.30-16.30****Subject : 225-351 Production Planning and Control Room : R300**
.....**Instructions :**

1. There are 4 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 marks	Score
1	25	
2	15	
3	25	
4	35	
Total	100	

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Instructor**

1. The past 6-month sales volume of a company in 2005 is shown below :

Month	Year 2005					
	Jan	Feb	Mar	Apr	May	June
Sales (Units)	150	176	201	195	225	280

(a) Forecast the sales volume in July 2005 using Adaptive Filtering technique using $w_1 = w_2 = 0.5$, and learning constant = 0.00001 (w_1 and w_2 are the initial weights)

(20 points)

(b) Calculate MSE

(5 points)

2. An aircraft company uses rivets at an annual rate of 150 tons. The rivet costs \$ 2.00 per kg., and the company production staff estimates that it costs \$ 20.00 to place and order, and the inventory cost is 10% per year (based on the maximum inventory level).

(a) What is the optimal quantities to be ordered. How frequently the orders should be placed ? (5 points)

(b) If the actual costs are \$ 120.00 to place an order and the actual carrying cost remains at 10% per year, how much is the company losing per year because of imperfect cost information ? (10 points)



3. A shipping agent has four trucks for its freight transport. Since this week's freight movements are extensive, the agent is considering an effective way of allocating its four trucks to three separate routes (A, B and C). The gross margin of each route depending on the number of trucks allocated is estimated as shown in the following table.

No. of trucks	Gross Margin per week		
	A route	B route	C route
1	\$ 2,200	\$200	\$ 1,600
2	3,400	2,000	3,000
3	4,200	2,600	3,600

The cost of hiring one truck with a driver amounts to \$ 700 including labor and gasoline cost.

How many trucks out of four should be allocated to each route ?
(25 points)

4. A manufacturing company produces ball - bearing sets for automobile industry. The sales forecast for the next six months of the year is as follow :

Month	Jan	Feb	Mar	Apr	May	June
Sales (sets)	600	700	900	1000	500	850

The company hires 35 employees working on 8-hours basis and the working days for each month are :

Jan	Feb	Mar	Apr	May	June
26	21	26	22	24	23

The overtime available for this company is 5 hours per day and if the demand is too high the company can hire the subcontractors outside to produce unlimited amount of the product at 350 Baht per set.

One set of ball-bearing requires 15 man-hours. The regular time wage is 10 Baht per man-hour and the overtime wage is 1.5 times of the regular time wage. Average carrying cost of the product is 2 Baht per set per month. The shortage cost is 5 Baht per set per month. Material cost and other variable costs (excluding labor cost) is 100 Baht per set.

The initial inventory in last December is 80 sets and the company decides to produce extra 10% of the demand in each month to be a safety stock in the next month.

Calculate the optimal production plan for this company during the 6-month period. What is the total production cost ?

(35 points)