

Name ID Code

Prince of Songkla University

Faculty of Engineering

Mid term Examination : Semester I

Academic Year : 2009

Date : July 26, 2009

Time : 09:00 – 12:00

Subject : 225-347 Production Planning and Control

Room : หัวหุ่นยนต์

ทฤษฎีในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
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 form other students is prohibited.

Problem no.	Full Score	Score
1	20	
2	25	
3	20	
4	15	
5	20	
Total	100	

Assoc. Prof. Dr. Sunchai Klinpikul

Instructor

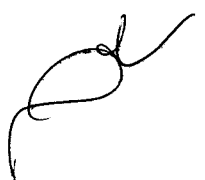


1. Past quarterly sales record of a transformer was :

Year 2007				Year 2008			
Q ₁	Q ₂	Q ₃	Q ₄	Q ₁	Q ₂	Q ₃	Q ₄
150	220	110	60	140	180	95	50

Forecast the sales in 2009 using the winter seasonal forecasting technique and use $\alpha = 0.25$, $\beta = 0.05$, $\gamma = 0.50$

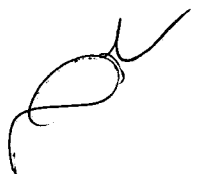
(20 points)



2. The Panal Plus Company produces particle board from rubber woods at a constant production rate throughout the year. The company imports special glue from Japan with the average lead time of 15 days at the amount of 600 tons per year. The order cost including transportation and tax is 1,450 Baht per order. The price of the glue is 70 Baht per kilogram. The quality of the glue is deteriorate and approximately 2% of the glue is to be rejected each year. The company has to pay for the insurance for the glue and warehouse at a fixed rate of 12,000 Baht per month. The company hires 2 workers for storage operations at 5,000 Baht per month per person. Interest rate is 7.5% per year.

(a) What is the proper amount of glue to be ordered and how many order should be placed per year to minimize total inventory cost. (15 points)

(b) If the maximum lead time in the past was 40 days, what is a proper re-order point if the shortage of glue is not allowed. (The company operate 350 days per year) (10 points)



3. Of the many products manufactured by the Arco Manufacturing Company, only products C, D, E and F pass through the following departments : shaper, milling, drilling, and assembly. The requirements per unit of product in hours and profit margin are as follows :

<u>Product</u>	<u>Shaper</u>	<u>Milling</u>	<u>Drilling</u>	<u>Assembly</u>	<u>Prof. Margin/unit</u>
C	0.5	2.0	0.5	3.0	\$ 8.00
D	1.2	1.0	0.6	1.5	\$ 9.00
E	1.0	1.1	0.9	2.0	\$ 7.00
F	0.5	1.3	1.4	3.5	\$ 6.00

The available capacities this month for product C, D, E and F and minimum sales requirements are :

<u>Capacities (hours)</u>		<u>Minimum Sales Requirements</u>	
Shaper	1,800	Product C	100 units
Milling	2,800	Product D	600 units
Drilling	3,000	Product E	500 units
Assembly	6,000	Product F	400 units

Formulate a Linear programming model for the best Production plan of this company.

(20 points)

Name ID Code

4. A certain plant produces 1,000 units per day, 10% of which are defective. The selling price per unit is \$ 10.00, variable cost per unit \$ 2.00 and fixed cost per day \$ 5,500. Each defective value is assumed to be zero. This plant is now in an under capacity situation. Daily output could be increased to 1,200 units if the operating speed of the machine is raised. Experimental data reveal that this will increase the rate of defective products to 15%. Is this plan profitable ?

(15 points)



Name ID Code

5. (a) What are the major components in production/service management ?

(5 points)

(b) What are the goals and strategies for each component in (a)

(15 points)

