Name _____ Student ID _____

Prince of Songkla University
Department of Industrial Engineering, Faculty of Engineering

Mid Term Examination: Semester 2	Academic Year: 2006
Date: 21 December 2006	Time: 9:00-12:00
Subject: 225-601 Supply Chain Management	Room: A201

ทุจริตในการสอบ โทษขั้นต่ำ คือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียนหนึ่งภาคการศึกษา

Instructions: Read carefully
1. All materials are allowed.
2. There are 3 sections for this test. Section 1 has 4 problems, section 2 has 5 problems and section 3 has 8 problems. Do all of them. Also show your work clearly and legibly.
3. Answer the questions in this test paper, only.
4. You must write your name and your student ID in every page of the test.
5. Total score is 140 points.

Distribution of Score

Section	Problem	Points	Points Gained
1	1	6	
	2	6	
	3	6	
	4	6	
2	1	10	
	2	15	
	3	10	
	4	16	
	5	25	
3	1	5	
	2	5	
	3	5	
	4	5	
	5	5	
	6	5	
	7	5	
	8	5	

Tests are prepared by
Nikorn Sirivongpaisal

Name _____ Student ID _____

Section 1: **(24 points)** Answer the following questions. Explain your answer or concept clearly.

Problem 1: (6 points) Explain the concept of process management. And how is it related to supply chain management?

Problem 2: (6 points) As known "It is challenging to design and operate a supply chain so that total systemwide costs are minimized, and systemwide service levels are maintained. And the process of finding the best systemwide strategy is know as global optimization." What are the factors making the global optimization so difficult?

Problem 3: (6 points) Explain the advantages and disadvantages of using between "Network Modeling" and "Simulation Optimization" to solve logistics network configuration problem.

Problem 4: (6 points) What are the main factors that contribute to "The Bullwhip Effect"?

Name _____ Student ID _____

Problem 1: (10 points) A large automobile repair shop installs about 1,250 mufflers per year, 16 percent of which are for imported cars. All the imported-car mufflers are purchased from a single local supplier at a cost of $18.50 each. The shop uses a holding cost based on a 27.24 percent annual interest rate. The setup cost for placing an order is estimated to be $31.50.

(a) Determine the optimal number of imported-car mufflers that the shop should purchase each time an order is placed, and the time between placements of orders. (Use 1 year = 52 weeks)

(b) If the replenishment lead time is six weeks and demand is constant, what is the reorder point based on the level of on-hand inventory?

Problem 2: (15 points) A particular inventory facility uses the (s,S) inventory model for inventory control policy. Replenishment orders from the facility arrive in exactly 10 days time. The demand distribution at the facility is observed to be a normal distribution with mean of 10 per day and a standard deviation of 2. What should be the safety stock level, order-up-to level, and reorder point if the customer service is to be at least 90 percent? What will they be if the service level is to be at least 99 percent?

Problem 3: (10 points) Suppose that you have just been hired as an operation analyst for a new retail chain. Your first assignment is to evaluate and recommend an inventory policy to the management. You are given the following information for three categories of the products.

	Demand (per week)	Std. Deviation	Average Retail Price	Average Cost
Turtlenecks	2500	357	38	20
Wool Coat	1500	188	80	55
Jean Jacket	1900	230	59	42

Fixed order cost is $500 per order per product. Lead time is 2 weeks. Inventory holding cost is 25% of inventory value annually. Determine the appropriate inventory strategy if you will employ a weekly periodic review policy (i.e. specify when to place orders, how much to order, etc.). Assume a service level is 95%.

Problem 4: (16 points) Formulate this supply chain model with the network flow programming with the objective to minimize the total cost flow from upstream supply chain to downstream supply chain.

Plant   Transhipment nodes   Demand
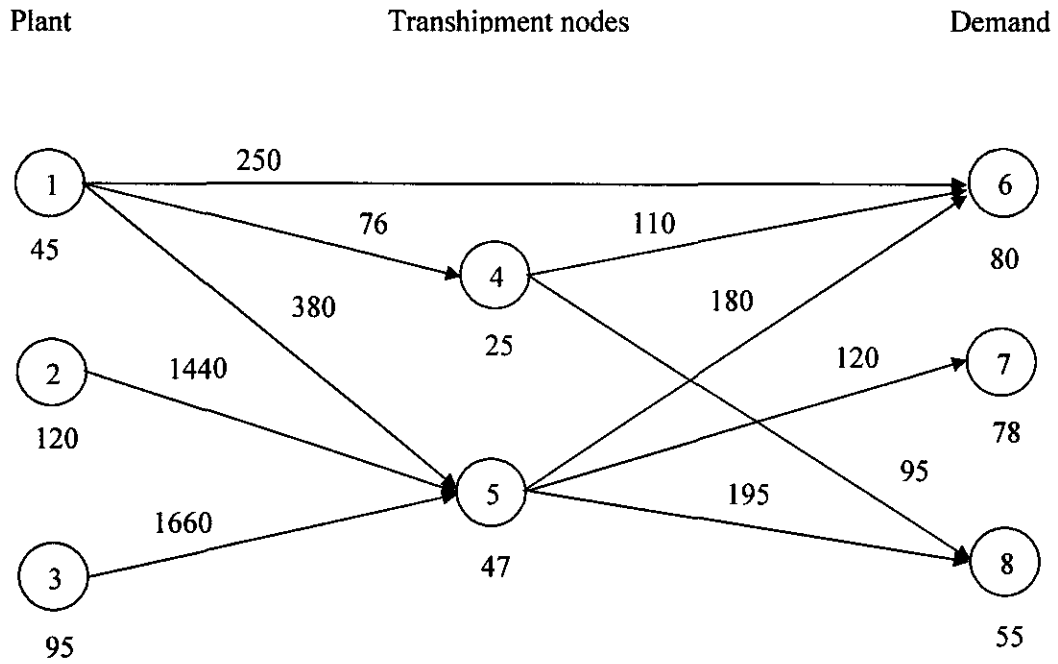
Problem 5: (25 points) The traffic manager of the electric company has just received a rate reduction offer from a trucking company for the shipment of motors to the company's field warehouse. The proposal is a rate of $3 per 100 pounds if a minimum of 40,000 pounds is moved in each shipment. Currently, shipment of 20,000 pounds of more are moved at a rate of $5 per 100 pounds. If the shipment size falls below 20,000 pounds, a rate of $9 per 100 pounds applies. If you are this traffic manager, should the company put the new rate to use? The following information has been provided to the manager to make decision.

Annual demand on warehouse	5,000 motors per year
Warehouse replenishment orders	43 orders per year
Weight of each motor	175 pounds per motor
Standard cost of motor in warehouse	$200 per motor
Stock replenishment order-handling costs	$15 per order
Inventory carrying costs as a percentage of average value of inventory on hand for a year	25% per year
Handling cost at warehouse	$0.30 per 100 pounds
Warehouse space	Unlimited

Section 3: (40 **points**) Answer the following questions.

Problem 1: (5 **points**) Explain the relationship between "Toyota Production System" and "Lean Manufacturing". Also James Womack and Daniel Jones classified lean manufacturing into five processes. What are they?

Problem 2: (5 **points**) Illustrate the diagram of the Toyota Production System House (TPS House)

Problem 3: (5 points) Explain the meaning of these following words

- Nemawashi

- Genchi Genbutsu

- Jidoka

- Heijunka

- Hansei

Problem 4: (5 points) Summarize what are the 14 Principles of Toyota Way which are applied when they developed Lexus model and Prius Model?

Problem 5: (5 points) What are the guiding principles (หลักการชี้นำ) of Toyota Motor Corporation?

Problem 6: (5 points) What are the advantages of "One-Piece Flow"?

Problem 7: (5 points) What are the disadvantages of not applying "Heijunka"?

Problem 8: (5 points) What is "Andon"?