Name _____ Student ID _____

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

Final Examination: Semester 2	Academic Year: 2005
Date: 23 February 2006	Time: 13:30-16:30
Subject: 225-601 Supply Chain Management	Room: R 300

ทุจริตในการสอบ โทษขั้นต่ำ คือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียนหนึ่งภาคการศึกษา

Instructions: Read carefully
1. All materials are allowed.
2. There are 2 sections for this test. Section 1 has 4 problems and section 2 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 120 points.

Distribution of Score

Section	Problem	Points	Points Gained
1	1	15	
	2	20	
	3	10	
	4	15	
2	1	7.5	
	2	7.5	
	3	7.5	
	4	7.5	
	5	7.5	
	6	7.5	
	7	7.5	
	8	7.5	

Tests are prepared by
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Section 1: (60 points) Answer the following questions.

Problem 1: (15 points) An appliance manufacturer located in Songkhla purchases 3,000 cases of plastic parts valued at 100 Baht per case from two suppliers. Purchases are currently divided equally between the suppliers. Each supplier uses rail transport and achieves the same average delivery time. However, for each day that a supplier can reduce the average delivery time, the appliance manufacturer will increase 5 percent of its total purchase, or 150 cases to the supplier, who reduce the delivery time. A supplier earns a margin of 20 Baht on each case before transportation charges.

Supplier "A" would like to consider whether it would be beneficial to switch from rail to air or truck modes. The following transportation rates per case and average delivery times are known for each mode:

Transport Mode	Transport rate	Delivery Time
Rail	2.50 Baht/case	7 days
Truck	6.00 Baht/case	4 days
Air	10.35 Baht/case	2 days

If you are supplier "A", what will be your decision for selecting transport mode?

Problem 2: (20 points) The transportation manager needs to find the shortest path from his factory (node O) to the retailer (node T) through the road system shown in the figure below. Find the shortest path on this road system. Number on each arc represents distance.
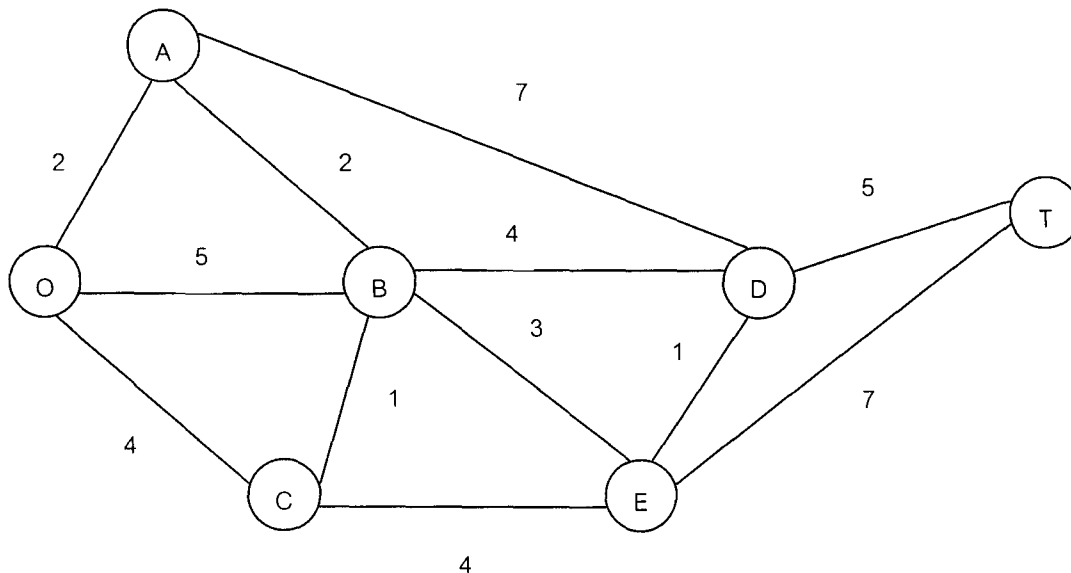
Problem 3: (10 points) One of the main products of the "A" company is canned fishes. The fishes are prepared at three canneries and then shipped by truck to four distributing warehouse. Since the shipping costs are a major expense, management is initiating a study to reduce them as much as possible. For the upcoming season, an estimate has been made of the output from each cannery, and each warehouse has been allocated a certain amount from the total supply. The information, along with the shipping cost per truckload for each cannery-warehouse, is given in the below table. Formulate objective function to determine which plan for assigning these shipments to the various cannery-warehouse combinations. (Do not solve the optimum solution.)

| | | Shipping Cost per Truckload | | | | |
| | | Warehouse | | | | |
		1	2	3	4	Output
Cannery	1	464	513	654	867	75
	2	352	416	690	791	125
	3	995	682	388	685	100
Allocation		80	65	70	85	

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Problem 4: (15 points) The company, which has two plants supplying the warehouse, which, in turn, supplies three demand centers, is considering the location for the single warehouse that will minimize transportation costs. Each plant and demand center location is expressed as a geometric coordinate point, as following figure. Product A is supplied from P1 and product B from P2. These products are reshipped to the markets. Coordinate points, volumes, and transportation rates are summarized in the following table. Find the estimated location for the warehouse and calculate the estimation of transportation cost. **Note:** scale of figure is 1:10 Km.
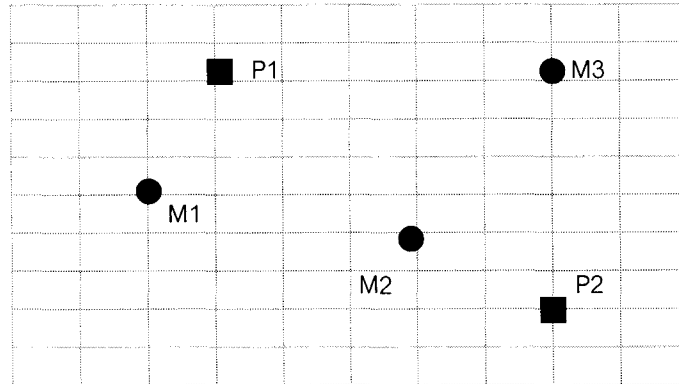
Point(i)	Product	Total Volume Moving (units)	Transportation Rate (Baht/unit/Kilometer)	Coordinate Xi	Coordinate Yi
P1	A	2000	0.050	3	8
P2	B	3000	0.050	8	2
M1	A&B	2500	0.075	2	5
M2	A&B	1000	0.075	6	4
M3	A&B	1500	0.075	8	8

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Section 2: (60 points) Answer the following questions. Explain your answer or concept clearly. Each problem is equally scored.

Problem 1: Explain the concept of push, pull, and push-pull based supply chain.

Problem 2: What is Third-Party Logistics? What are advantages and disadvantages of 3PL?

Problem 3: Explain a framework for "make or buy decisions" for supply chain manager.

Problem 4: Explain the concept of design for logistics.

Problem 5: What is mass customization?

Problem 6: Explain the components of RFID system.

Problem 7: Explain the application of RFID system in food traceability.

Problem 8: What are the benefits and risks of outsourcing?