淡江大學九十四學年度碩士班招生考試試題 163-1

系別：管理科學研究所　　科目：作 業 研 究

准帶項目請打「V」	
✓	簡單型計算機

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本試題雙面印製

1. **Please list and brief discuss the assumptions of linear programming** (10%).

2. **Please list and brief discuss the assumptions of the basic economic order quantity (EOQ) model** (10%).

3. TOTOCO assembles three types of toys: trains, trucks, and cars using three operations. The daily limits on the available times for the three operations are 430, 460, and 420 minutes, respectively; and the profits per toy train, truck, and car are \$3, \$2, and \$5, respectively. The assembly times per train at the three operations are 1, 3, and 1 minutes, respectively. The corresponding times per truck and per car are (2, 0, 4) and (1, 2, 0) minutes.
   (i) **Formulate the problem as a linear programming model and solve it.** (5%)
   (ii) **Formulate the problem as it dual model and solve it.** (5%)
   (iii) Suppose that TOTOCO wants to expand its assembly lines by increasing the daily capacity of each line by 40%. **Please calculate the optimal solution from its original optimum tableau.** (5%)
   (iv) Suppose that TOTOCO wants to shift the slack capacity of operation 3 to the capacity of operation 1. **Please re-calculate the optimal solution from its original optimum tableau.** (5%)

4. Given the following information please **set up the problem in a transportation table and solve for the minimum-cost plan** (7%, 8% each):

	PERIOD		
	1	2	3
Demand	550	700	750
Capacity			
Regular	500	500	500
Overtime	50	50	50
Subcontract	120	120	100
Beginning inventory	100		
Costs			
Regular time	\$60 per unit		
Overtime	\$80 per unit		
Subcontract	\$90 per unit		
Inventory carrying cost	\$1 per unit per month		
Back-order cost	\$3 per unit per month		

注意背面尚有試題▶

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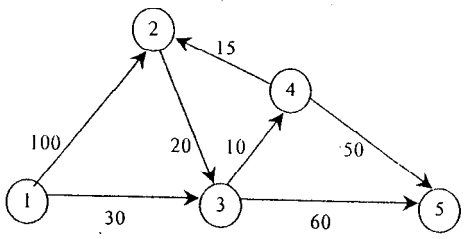
5. The network in the following figure gives the routes and their lengths in miles between city 1 (node 1) and four other cities (nodes 2 to 5). Determine the **shortest routes** between city 1 and each of the remaining four cities (15%).



6. Please use **cutting plan algorithm to solve the following integer linear program** (15%).

Maximize $z = 7x_1 + 10\,x_2$

Subject to

$$-x_1 + 3\,x_2 \le 6$$
$$7x_1 + \quad x_2 \le 35$$
$$x_1\,, x_2 \ge 0 \text{ and integer.}$$

7. Examine the following function for **extreme points** (10%).

$f(x) = (3x - 2)^2\,(2x - 3)^2$

8. Please state the situation resulting in **alternative optimal** (5%).