## 國立中央大學八十七學年度碩士班研究生入學試題卷

所別: 工業管理研究所 乙組 科目:

作業研究

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## 每题配分: 20 分

1. A producer has a stock of orders for next 6 weeks and delivers every week. Let

 $d_t$ : known demand for week t, all  $d_t \ge 0$ 

ct: the unit cost of production in week t

Kt: the maximum can be produced in week t

ht: unit inventory cost in week t

The inventory is measured as the units carried from week t to week t + 1. Suppose the initial inventory is known to be  $l_0$  units. To find a production-inventory plan that satisfies the known delivery schedule over the next 6 weeks at minimum total cost, you need to model this problem in the Linear Programming form. (Do not solve the problem.)

2. Find the dual of the LP model in each of the following problems:

(a) Maximize 
$$z = 4x_1 - x_2 + 2x_3$$
  
subject to  
 $x_1 + x_2 \le 5$   
 $2x_2 + x_2 \le 7$   
 $2x_2 + x_3 \ge 6$   
 $x_1 + x_3 = 4$ 

 $x_1 \ge 0$ ,  $x_2$  and  $x_3$  are unrestricted in sign

(b) Minimize  $z = 4x_1 + 2x_2 - x_3$ subject to

$$x_1 + 2x_2 \le 6$$
  
 $x_1 - x_2 + 2x_3 = 8$ 

 $x_1, x_2 \ge 0$ , and  $x_3$  is unrestricted in sign

3. Fill the blanks marked with "?" for the below optimal primal and dual tableaus.

## Primal

Basic	x1	x2	s l	s2	s3	solution
2	0	0	. ?	?	0	28
x2	0	1	1	-1/6	0	4
x1	1	0	- [	?	0	2
s3	0	0	?	-2	1	8

Dual

Basic	yi	<b>y</b> 2	уl	s't	s'2	solution
z	0	0	?	?	?	28
y2	0	1	2	-1/3	1/6	1/2
y1	1	0	-4	1	- ]	1

4. Given the following cost table for an assignment problem, determine the optimal assignment for this problem, and compute total minimum cost. Identify all alternative solutions if multiple optimal solutions exist.

Machine Worker	Λ	В	С	b
l	\$10	\$2	\$8	\$6
2	9	5	11	9
3	12	7	14	14
4	3	1	4	2.

5. Assume that each node in the following network represents a telephone location, and the objective is to connect all telephone locations using the minimum amount of telephone line. Determine the minimal spanning-tree solution.

