國立臺北科技大學

九十四學年度工業工程與管理系碩士班入學考試

作業研究試題

填准考證號碼

注意事項：

1. 本試題共五題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在答案卷之答案欄內，否則不予計分。

一、Which of the following questions are **TRUE** or **FALSE** ? Why ? (5 points each)

(1) Min Z=max $\{|2X_1+3X_2|, |X_1-X_2|\}$

Subject to $X_1, X_2 \geq 0$

is a LP model.

(2)When the optimal solution of a LP model is overdetermined, it means at least on of the constraints is redundant and vice versa.

(3)The system **BX=b** has infinity of solutions if **B** is singular, and **b** is dependent relative to the vectors of **B**.

(4) The iteration of a LP model is given by the following tableau

Basic	X_1	X_2	X_3	X_4	Solution
Z	-2	-1	0	0	0
X_3	1	-1	1	0	10
X_4	2	0	0	1	40

We can say it is redundant.

二、(1)Solve by the dual simplex algorithm.(10 points)

Max $Z = 6X_1 + 3X_2$

Subject to

$$X_1 + X_2 \geq 10$$
$$2X_1 + 3X_2 \leq 12$$
$$X_1, X_2 \geq 0$$

(2)Have you met any problem in calculation? What is the reason? (5 points)

(3)What are the advantages and disadvantages of the dual simplex method. (5 points)

三、Consider the following Linear programming problem:

Max $Z = 5X_1 + 6X_2 + 4X_3$

Subject to

$$3X_1 + 4X_2 + 2X_3 \leq 120$$
$$X_1 + 2X_2 + 3X_3 \geq 30$$
$$X_1 + 2X_2 + X_3 \leq 50$$
$$X_1, X_2, X_3 \geq 0$$

The optimal simplex Tableau is as follows:

Basis	C_B	X_1	X_2	X_3	S_1	S_2	S_3	Solution
		5	6	□	0	0	0	
S_3	0	0	4	0	-2	7	1	80
X_3	4	0	□	1	-1	3	0	30
X_1	5	1	0	0	1	-2	0	20
Z_j		5	8	4	1	2	0	220
$C_j - Z_j$		0	-2	0	-1	-2	0	

(1) Find the values of two □ in the tableau. (10 points)

(2) Compute the range of optimality of C_1. (5 points)

(3) Find the dual price for the third constraint. (5 points)

注意：背面尚有試題

四、Nine jobs are to be processed through four workers. Each worker can process any job, but at different efficiencies. A worker can not process more than one job at a time. The time requirements per job/man assignment and total times available for each worker are shown in the accompanying table. Determine the assignment that minimizes the total processing time.(20 points)

Job \ Worker	A	B	C	D
1	4	3	12	7
2	8	10	12	6
3	3	5	2	5
4	10	6	2	4
5	10	3	7	9
6	8	10	9	9
7	7	2	10	12
8	5	9	4	17
9	10	8	15	7
Available Time	15	12	20	14

五、Let $A=\begin{bmatrix}5 & 4\\ 4 & 5\end{bmatrix}$

(1) Find the rank of A. (5 points)

(2) Find the eigenvalues of A.(5 points)

(3) Find the eigenvectors of A. (5 points)

(4) We understand $B^2 = A$, Find B. (5 points)