國立勤益科技大學九十八學年度研究所碩士班招生筆試試題卷

所別：工業工程與管理研究所　　組別：

科目： 作業研究

准考證號碼：□□□□□□□□（考生自填）

考生注意事項：

一、考試時間 100 分鐘。

二、

三、

試題一：〈30 分答錯倒扣 1 分〉

1. ***True/False:*** Indicate by "O" = "true" or "X" ="false." (Each 3 points, total 30 points, 答錯倒扣 **1 point**)

___ 1. If an artificial variable is nonzero in the optimal solution of an LP problem, then the problem has no feasible solution.

___ 2. If a random variable T has an exponential distribution, then $P\{T>3 \mid T\geq 1\} = P\{T > 1\}$.

___ 3. If, when solving an LP by the simplex method, you make a mistake in choosing a pivot row, the resulting tableau is infeasible.

___ 4. A stochastic process is "memoryless."

___ 5. If a primal minimization LP problem has a cost which is unbounded below, then the dual maximization problem has an objective which is unbounded above.

___ 6. One advantage of the revised simplex method is that it does not require the use of artificial variables.

___ 7. The goal programming model yields an efficient solution.

___ 8. The two-phase method solves for the dual variables in Phase I, and then solves for the primal variables in Phase II.

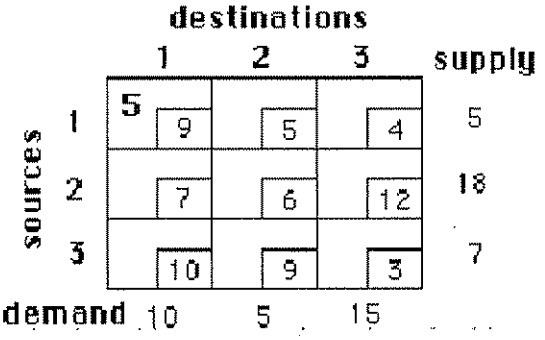
___ 9. The "Complementary Slackness" theorem says that if, for example, constraint #1 of the primal problem is "slack", then constraint #1 of the dual problem is "tight".

___ 10. A "pivot" in the simplex method corresponds to a move from one corner point of the feasible region to another.

試題二：〈20 分〉

2. Transportation Problem. (Each 2 points, total 20 points)

Consider the transportation problem with the tableau below:



a. How many basic variables does this problem have? _____

b. An initial basic feasible solution is found using the "Northwest Corner Method"; complete the computation (excluding x_{11}) x_{21} = _____, x_{22} = _____, x_{23} = _____, x_{33} = _____.

c. If u_1 (the dual variable for the first source) equals to 0, what is the value of

u_2 (the dual variable for the second source)? _____

v_1 (the dual variable for the first destination)? _____

v_2 (the dual variable for the second destination)? _____

d. Will increasing x_{12} improve the objective function? _____ (yes/no).

e. Regardless of whether the answer to **(d)** is "yes" or "no," what will the value of x_{12} be if it is entered into the solution? _____

試題三：〈10 分〉

3. Queueing Problem. (10 point)

Consider a one-server queueing situation in which the arrival and service rates are given by

$\lambda_n = 10 - n$, $n = 0, 1, 2, 3$

$\mu_n = 5 + 0.5n$, $n = 1, 2, 3, 4$

This situation is equivalent to reducing the arrival rate and increasing the service rate as the number in the system, n, increases.

a. Set up the transition diagram. (5 points)

b. Determine the balance equation for the system (you don't need to solve the equation). (5 points)

試題四：〈20 分〉

4. A furniture company is planning to produce 300 new type desks on three parallel machines. The following table gives the pertinent data of the situation. Formulate the problem as an ILP model. (20 points)

Machine	Setup cost	Production cost/unit	Capacity (units)
1	250	2	200
2	100	6	150
3	200	5	180

試題五：〈20 分〉

5. A store sells a special item whose daily demand can describe by the following probability density function. (20 points)

Daily demand, d	0	1	2
$p(d)$	.3	.4	.3

The store orders up to 3 units every 2 days if the stock level is less than 2, else do not order. Express the problem as a Markov chain, i.e. one-step transition matrix.
(Hint: it must be defined the probability density function of 2-days demand.)