大同大學 九十二 學年度研究所碩士班入學考試試題

考試科目：管理科學　　所別：資訊經營研究所　　

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. (25%) Consider the following problem.

Maximize $Z = 5X_1 + 3X_2 + 4X_3$

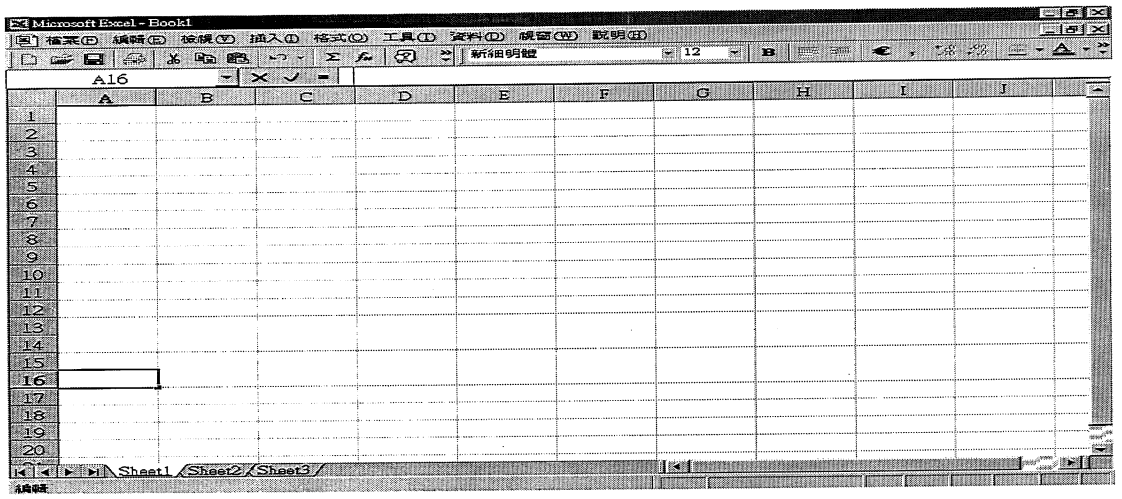
subject to

$2X_1 + X_2 + X_3 \leqq 20$

$3X_1 + X_2 + 2X_3 \leqq 30$

and $X_1 \geqq 0$, $X_2 \geqq 0$, $X_3 \geqq 0$.

Please use the following spreadsheet format to write down the necessary formula to solve this problem.



2. (25%) A petroleum company produces three grades of motor oil—super, premium, and extra—from three components. The company wants to determine the optimal mix of the three components in each grade of motor oil that will maximize profit. The maximum quantities available of each component and their cost per barrel are as follows.

Component	Maximum Barrels Available/day	Cost/bbl
1	4500	$12
2	2700	10
3	3500	14

In order to ensure the appropriate blend, each grade has certain general specifications. Each grade must have a minimum amount of component 1 plus a combination of other components as follows.

Grade	Component Specifications	Selling Price/bbl
Super	At least 50% of 1. Not more than 30% of 2	$23
Premium	At least 40% of 1. Not more than 25% of 3	20
Extra	At least 60% of 1. At least 10% of 2	18

The company wants to produce at least 3000 barrels of each grade of motor oil. Please formulate a linear programming model to describe the above question.

(Please show all works to get full credit ! 請列出計算過程否則不予給分)

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3. (25%) Consider the following transportation problem.

From	To 1	2	3	Supply
A	$6	9	M	130
B	12	3	5	70
C	4	8	11	100
Demand	80	110	60	

Formulate this problem as a general linear programming model, and solve it.

4. (25%) A single-server queuing system with an infinite calling population and a first-come, first-served queue discipline has the following arrival and service rates:

λ =16 customers per hours

μ =24 customers per hours

Determine P_0, P_3, L, L_q, W, W_q, and U.

(Please show all works to get full credit ! 請列出計算過程否則不予給分 **)**