Name:…… ID:……..

1. A company wants to purchase large, medium, and small delivery trucks. The company wants to purchase about 10 large, 5 medium, and 15 small trucks. Each large truck costs $30,000 and has a 10-ton capacity. Each medium truck costs $20,000 and has a 6-ton capacity. Each small truck costs $12,000 and has a 4-ton capacity. The company wants to have about 200 tons of capacity and spend about $600,000.

1.1 Formulate a goal programming model of this problem.

Objective function: (Not MiniMax Q)

Subject to:

1.2 Formulate a goal programming model of this problem. (9 points)

Objective function: (Using MiniMax Q)

Subject to:

Name:…… ID:……..

2. **Multiple Objectives Linear Programming**. A university hospital dietary staff is required to satisfy the minimum nutritional needs of the patients while minimizing total food costs. Each food can consist of a combination of five ingredients as presented in the table below. For nutritional needs, each food must contain at least 38 units of vitamin C and 44 units of vitamin D. Not more than 50 units of all ingredients may be used in a food. The three objective functions are

   f_1 = Minimize cost
   f_2 = Maximize food taste
   f_3 = Maximize food nutrition

   The problem is to decide the best combination of ingredients (X_i) to optimize the three objectives.

	Ingredient 1 (X_1)	Ingredient 2 (X_2)	Ingredient 3 (X_3)	Ingredient 4 (X_4)	Ingredient 5 (X_5)	Required
Vitamin C	4	1	2	1	2	At least 38
Vitamin D	2	2	3	0.5	1	At least 44
Ingredients	1	1	1	1	1	Not more than 50
Cost/unit	0.3	0.15	0.2	1	0.1	
Taste/unit	1	2	1	10	1	
Nutrition/unit	15	2	1	1	2	

Problem	Decision Variables					Objective functions		
	X_1	X_2	X_3	X_4	X_5	f_1	f_2	f_3
Minimize f_1	0	0	12.5	0	6.5	\$3.15	19	25.5
Maximize f_2	0	0	7.6	42.4	0	\$43.92	431.6	50
Maximize f_3	50	0	0	0	0	\$15.00	50	750

Write MOLP model