**BADM 3963 Summer 2015 Final exam part B**

**This is not a group project. Any indication of collaboration with others on this exam will result in a grade of F for the course for all students involved.**

**By submitting your work on Blackboard you are agreeing to the terms of the exam and attesting that the work is yours and yours alone.**

* **Answers to all three problems in Word document**
* **#3 LP Solver set up in Excel**
* **Submit both Word & Excel files in BB Quizzes**

1. Write the LP formulation for the following problem

Stuart Seeson, the manager of a sandwich shop, has just learned that there are 75 ounces of mayonnaise in the store room, of which 55 ounces is approaching its expiration date and must be used.

To use up the mayonnaise, Stuart has decided to prepare two items: an egg salad sandwich and a chicken salad sandwich. Each egg salad sandwich will require 0.50 ounces of the mayonnaise and each chicken salad sandwich will require 0.70 ounces of the mayonnaise. Past experience has shown that chicken salad sandwiches are more popular so Stuart wants to make sure there are at least twice as many chicken salad sandwiches as egg salad sandwiches. Storage space limits the total number of sandwiches to 110.

Profit on each chicken salad sandwich is $.35 and on each egg salad sandwich is $.43. Stuart must decide how many of each type of sandwich to make.

2. Write the LP formulation for the following problem

A dietitian has been asked by the athletic director of a university to develop a snack that athletes can use in their training programs. The dietitian intends to mix three separate products together to make the snack. The snack must have at least 50 grams of carbohydrates and at least 25 grams of protein but no more than 750 calories. The following information has been obtained by the dietitian:

|  |  |  |  |
| --- | --- | --- | --- |
| **Nutrient** | **Nutrient per ounce of ingredient**  **(grams per ounce)** | | |
|  | **Product A** | **Product B** | **Product C** |
| Carbohydrates | 2 | 5 | 4 |
| Protein | 6 | 1 | 4 |
| Calories | 90 | 50 | 70 |

Product A costs $0.20 per ounce, product B costs $0.10 per ounce and product C costs $0.17 per ounce.

Formulate this problem as an LP problem that will help the dietitian determine how much of each ingredient to put in the snack in order to minimize costs.

3. Set up and solve the following LP problem using Excel Solver. Report the optimal solution and objective result in your Word document.

The Pro-Shaft Company produces and markets three lines of tennis rackets: A, B, and C; A is a “standard” racket and B and C are “professional” rackets. The manufacturing process for the rackets is such that two operations are constrained – Stringing and Assembly.

In Stringing, racket A requires 3 hours, racket B 2.5 hours and racket C 2.7 hours..

In Assembly, racket A requires 2 hours of time; racket B requires 4 hours; and racket C requires 5 hours.

Stringing has 50 hours of time available per week and Assembly has sufficient manpower to support 80 hours per week. The market group for Pro-Shaft has projected that the demand for the standard racket (A) will be no more than 25 per week. Cost of production for racket A is $30 per racket, for racket B is $40 per racket and for racket C is $40 per racket. Sales revenue per racket is: for A $120, B $150, C $210.

Pro-Shaft needs to determine how many of each type of racket to produce in order to maximize profit.