Faculty of Engineering
Civil Engineering Department
CIVENG 3C03 – Fall 2022

Assignment 2
Due: Friday, October 21, 2022 – 11:59 PM
Late submission is not permitted

Question 1 (50 points)

A provincial park issues three types of passes to its customers (bronze, silver, and gold passes). Each pass type allows visitors to spend different times in the park and have access to different park amenities. The profit margins of the three pass types are $1, $3, and $10 per pass, respectively. The administrative working units required for the three pass types are estimated to be 1, 1, and 3.5 units, respectively. The monthly administrative working units available are 22000 units. Given the park's capacity, the park management can issue a maximum of 10,000 tickets of all types per month. Based on preliminary market research, the park management decided to make at least 1200 bronze passes available for customers at any month. Based on this information, what is the optimal number of each pass type that the park should issue to maximize its profit? Use the simplex method to develop your solution.

Question 2 (20 points)

Redo the first question Using Excel solver. (Please, submit your Excel file along with your assignment).

Question 3 (30 points)

A Canadian company produces three products (A, B, and C) and exports them to the European Union. The company's annual profit (in hundred thousand dollars) is expressed according to the following equation: $P = 2X_1 + 2.5\ X_2 + 5\ X_3 - 40$, where X_1, X_2, and X_3 are the quantities produced from the three products, respectively. The final iteration of the simplex tableau that was used to find the optimal production policy that maximizes the company's profit is shown below.

Basic Variables	C_j	-2	-2.5	-5	0	0	0	0
	b_i	X_1	X_2	X_3	S_1	S_2	S_3	S_4
X_1	17.71	1	0	0	1.14	0	-0.29	-2.29
S_2	225.54	0	0	0	-2.57	1	0.54	4.54
X_2	12.34	0	1	0	-0.57	0	0.34	0.34
X_3	25	0	0	1	0	0	0	1

Due to an unpredicted change in CAD/EUR exchange rate, the estimated unit profit of the three products changed. The new unit profit coefficients are (1.60, 1.90, and 3.75) respectively. The company is interested in knowing whether it can continue with the current production policy or it needs to develop a new one. Based on your understanding of the sensitivity analysis of LP problems, do you think that the company should change its production policy?