ESCUELA SUPERIOR POLITECNICA DEL LITORAL

Gerencia de Operaciones
Mejoramiento
Second Term 2016

Yo, ……., al firmar este compromiso, reconozco que el presente examen está diseñado para ser resuelto de manera individual, que puedo usar una calculadora ordinaria para cálculos aritméticos, un lápiz o esferográfico; que sólo puedo comunicarme con la persona responsable de la recepción del examen; y, cualquier instrumento de comunicación que hubiere traído, debo apagarlo y depositarlo en la parte anterior del aula, junto con algún otro material que se encuentre acompañándolo. No debo además, consultar libros, notas, ni apuntes adicionales a las que se entreguen en esta evaluación. Los temas debo desarrollarlos de manera ordenada. Como estudiante de ESPOL me comprometo a combatir la mediocridad y actuar con honestidad, por eso no copio ni dejo copiar. Firmo al pie del presente compromiso, como constancia de haber leído y aceptar la declaración anterior.

Firma: ……. Nro.Matrícula: ……

Paralelo: ……..

1.) Linear Programming Formulation

Sailco Corporation must determine how many sailboats it has to produce each month for the four quarters. Demand during each of the following four quarters is as follows: first quarter, 40 sailing boats; second quarter, 60; third quarter, 75; fourth quarter, 25. Sailco must comply with demand on time. At the beginning of the first quarter it had an inventory of 10 sailing boats. At the beginning of each quarter, Sailco must decide how many boats to produce during the quarter. In order to simplify the calculations, it is assumed that the sailboats made during a quarter are used to meet the demand for that quarter. During each quarter, Sailco manufactures up to 40 sailing boats with labor in regular shifts at a total cost of $400 per sailboat. If you have employees who work extra during a quarter, Sailco manufactures more sailboats with extra time labor at a total cost of $450 per sailboat.

At the end of each quarter (after producing the boats and meeting the demand this quarter), a cost of $20 is incurred for transportation or storage. Use linear programming to determine a production schedule in order to minimize the sum of production and inventory costs over the next four quarters.

a.) Variables (5 points)

b.) Objective (5 points)

c.) Restrictions (5 points)

d.) Total model (10 points)

2.) Transportation Problem

"EL ARBOLITO" has collected 400 tons of wood from pine forests located outside of Vinces, 200 tons outside Pascuales, and 100 tons outside the Sachilas. It is going to export the wood abroad, and Japan has ordered 200 tons at a price of $1,200 per ton. Taiwan needs 300 tons and will pay $1,100 per ton, and Singapore has ordered 200 tons at a price of $1,000 per ton. To "EL ARBOLITO", it costs $500 dollars to bring each ton of lumber to Vinces, $400 per ton to Sachiles and $300 per ton to Pascuales. The following table provides the cost of shipping each ton by sea from the cities to the respective countries:

SHIPPING COST ($ / TON) TO TAKE THESE COUNTRIES			
	Japan	**Taiwan**	**Singapore**
Vinces	250	250	200
Sachilas	250	200	200
Pascuales	200	150	150

a. Draw a distribution network that lists supplies, demands and other relevant data appropriate (10 points)

b. Formulate a mathematical model to determine a distribution plan to maximize the corporate profits (10 points)

3.) Inventory

The ePaint Store keeps paint in their store and sells paint on their online website. The stocks of several paint brands are stored; however, its largest seller is Sharman-Wilson Ironcoat. The company wants to determine the optimal order size and total inventory cost for a special Cast Iron Protection Paint, given an estimated annual demand of 10,000 gallons of paint, an annual storage cost of $0.75 per gallon , And an order cost of $150 per order. They would also like to know the number of orders to be made annually and the time between orders (i.e. the order cycle).

Now, suppose the ePaint Store has its own manufacturing facility where Ironcoat is produced. The company operates the same days that the warehouse is open (i.e. 311 days) and produces 150 gallons of paint per day. Determine the optimal size of the order, the total cost of the inventory, the time to receive an order, the number of orders per year, and the maximum inventory level.

a) Optimum size of the order and total cost of inventory (5 points)

b) Number of orders per year and order cycle (5 points)

c) Optimal size and total cost of the order (production) (5 points)

d) Time to receive the order, number of orders per year and maximum inventory level (10 points)

4.) Decision Trees

Colaco is currently active for $150,000 and wants to decide whether or not it sells a chocolate-flavored soft drink, Chocota. Colaco has three options:

Option 1: Locally test the Chocota market and then use the market survey results to determine whether or not you sell the Chocota nationally.

Option 2: Sell Chocota nationwide immediately without market test.

Option 3: Decide immediately, without a market test, to not sell the Chocota nationwide.

In the absence of a market study, Colaco believes that Chocota is 55% likely to be nationally successful and Colaco's investment status will increase by $ 300,000. Also in the absence of a market study, Colaco believes that Chocota is 45% likely to be a national failure and the current assets will decrease by $ 100,000.

If Colaco, conducts a market study at a cost of $ 30,000, there is a 60% chance that the study will produce favorable results, which is called local success. If you get local failure, there is only a 10% chance that Chocota will be a national success. If Colaco is risk-neutral, that is, you want to make the most of your assets, what strategy should you follow?

a) Decision tree (10 points)

b) Expected values per branch (5 points)

c) Describe the decision to be made. (5 points)