ORDRE DES INGÉNIEURS DU QUÉBEC

NOVEMBER 2012 SESSION

All documentation allowed
Calculators : only authorized models
Duration: 3 hours

98-Ind-B9 Logistics : Transportation aspects

Question 1 (10 points)

Explain the interaction of the logistic function with two (2) other business functions by describing the necessary interfaces.

Question 2 (6 points)

Give examples of strategic, tactical and operational level decisions (1 point each) in regards with the following decision elements:

a) Transport
b) Location

Question 3 (8 points)

Identify and explain four (4) factors that influence the transportation cost.

Question 4 (6 points)

Name and explain with an example two (2) reasons why packaging material should be reduced.

Question 5 (10 points)

A company that manufactures electronic products (tablet) in Asia for sale across North America wants to reduce its total cost of logistic. Propose two (2) solutions and list the advantages and disadvantages of each.

Question 6 (15 points)

Name and explain five (5) considerations regarding material handling when choosing a storage strategy

Question 7 (20 points)

A manufacturer of auto parts is looking for a new distribution center for its two (2) plants (U_1 and U_2). The new distribution center will be more modern and closer to clients as that current will be closed also. Figure 1 shows the position of the current distribution center (D_A) and two (2) potential sites (D_1 and D_2) under study. Major customers (C_1 -C_4) position is also indicated on the map. Table 1 gives the number of transport (full truck) performed weekly between sites. Edge of the grid represents 10 km and transportation is on the edges (road network approximation).

a) Calculate the matrix of costs, if the cost of transportation is $ 6 per kilometer. (10 points)
b) Determine the cost of each of the solutions and make your recommendation. (10 points)

Figure 1

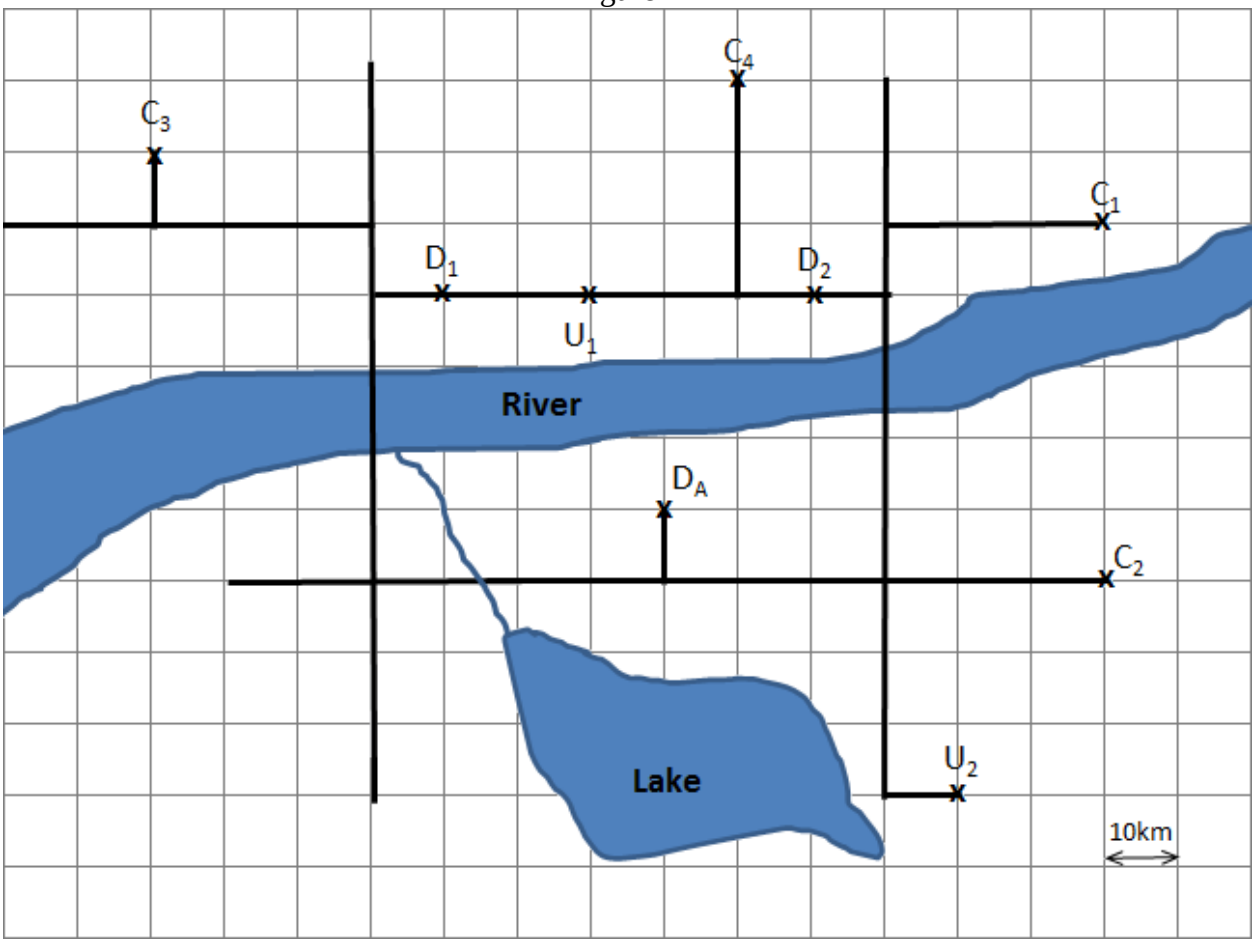

Table 1

Origin - Destination	Number of trips per week
U_1-D_A	24
U_2-D_A	16
D_A-C_1	8
D_A-C_2	12
D_A-C_3	10
D_A-C_4	8

Question 8 (20 points)

A distributor of electronic products (TVs) wishes to review the vehicle routes for its 5 stores in a large urban center. Figure 2 shows the position of the warehouse and stores. The truck capacity is 300 products and its operating cost is $ 45 per hour. Edge of the grid represents 5 km and transportation is on the edges (approximation of the road network) based on the indicated speed on the map. The daily demand for each store is given in table 2. The company wants to keep stocks in store to a minimum. The delivery is done from Monday to Friday.

a) Calculate the origin-destination cost matrix. (10 points)
b) Propose and estimate the cost of vehicle routes for the week to meet the demand of each store (no shortage) and other constraints. (10 points)

Figure 2

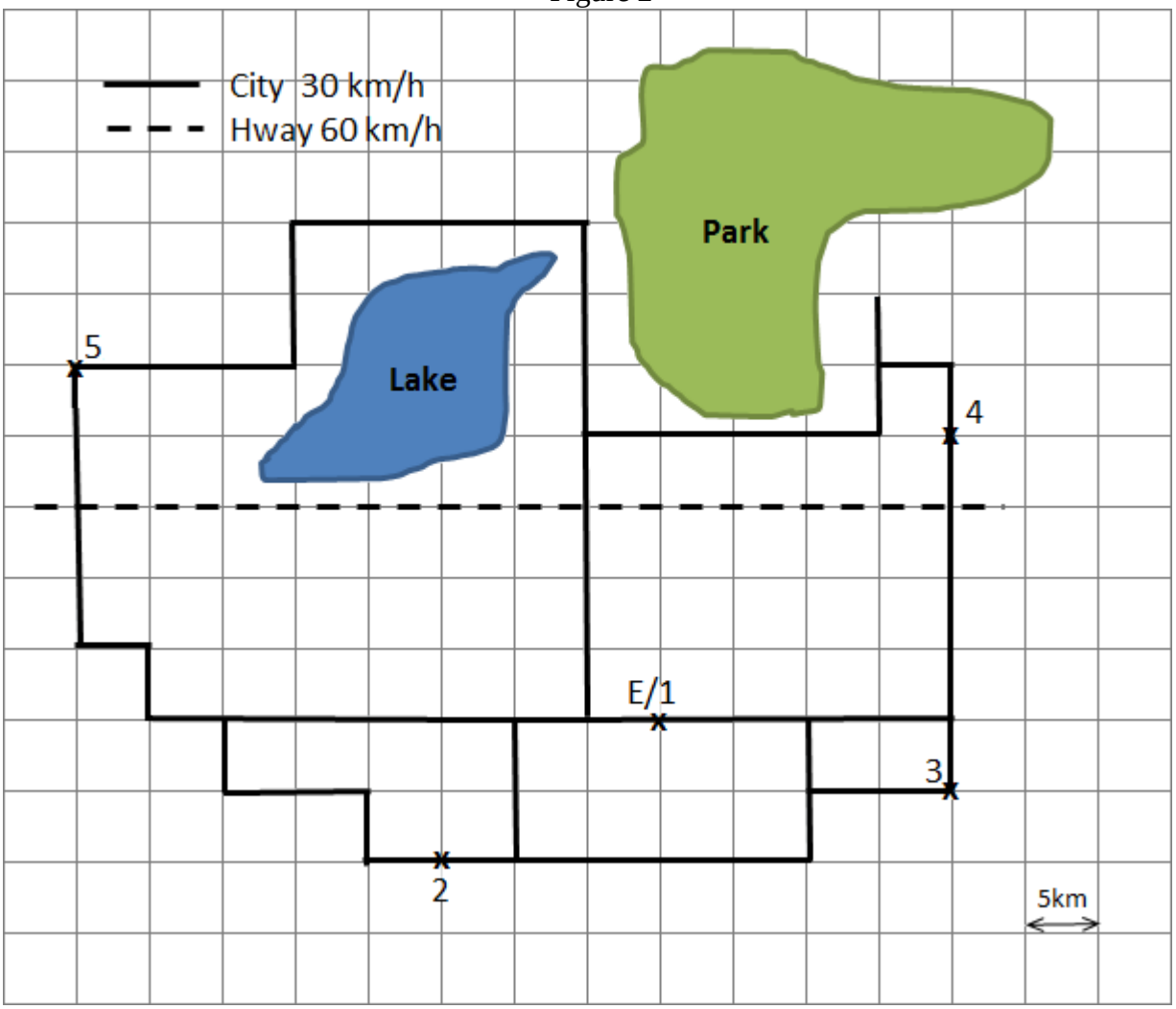

Table 2

Store	Daily demand
1	80
2	100
3	160
4	250
5	50