I pledge on my honor that I have not given or received any unauthorized assistance on this

assignment/examination. I further pledge that I have not copied any material from a book, article,

the Internet or any other source except where I have expressly cited the source.

Signature: Kanika Yadav

Date: 09/22/2022

Topic name -

Name - Kanika Yadav

Date: October 6, 2022

W&A Chapter - 5

Question No – Q20, Q30 & Q67

Page no – 256, 266, 284

**W&A Chapter 5**

**Q1.  4th Edition Q20 or 3Edition Q19 Transportation at Redbrand  - Use data in P05\_20 under Problem Data**

[P05\_20.xlsx](https://sit.instructure.com/courses/60732/files/10002685?wrap=1)[Download P05\_20.xlsx](https://sit.instructure.com/courses/60732/files/10002685/download?download_frd=1)

**Note: optimize the problem firstly with data given here, then reoptimize as per the question, and report how the modification of the question changes the results**

20. In the original RedBrand problem, suppose the plants cannot ship to each other and the customers cannot ship to each other. Modify the model appropriately and reoptimize. How much does the total cost increase because of these disallowed routes?

**Management Overview**

**Problem Statement:**

20. In the original RedBrand problem, suppose the plants cannot ship to each other and the customers cannot ship to each other. Modify the model appropriately and reoptimize. How much does the total cost increase because of these disallowed routes?

**Data Sources:** Given in P05\_20 xls

**Model Approach:**

Network Model with Arc and minimizing the cost of total path from Origin to destination

**Solution & Conclusion:** For the RedBrand problem if the plants cannot ship to each other and the customers cannot ship to each other hence the Excel changes the costs from Origin to Destination to exclude those sequences.   
1. Case 1 where we do not apply the constraints the optimal solution is **$3,102.50**

2. Case 2 where we apply the constraints so that the plants cannot ship to each other and the customers cannot ship to each other, we get optimal solution of - **$4,160.00**

**Q2. 4th Edition Q30  Maude's Walk - Use data in P05\_50 under Problem Data**

**Problem Statement:**

[**P05\_30.xlsx**](https://sit.instructure.com/courses/60732/files/10002690?wrap=1)[**Download P05\_30.xlsx**](https://sit.instructure.com/courses/60732/files/10002690/download?download_frd=1)

**Note: optimize the problem firstly with data given here, then reoptimize as per the question, and report how the modification of the question changes the results.**

1. In Maude’s shortest path problem, suppose all arcs in the network are double-arrowed, that is, Maude can travel along each arc (with the same distance) in either direction. Modify the spreadsheet model appropriately. Is her optimal solution still the same?

**Data Sources:**

Data source is same as in P05\_30 given xls sheet.

**Model Approach:** We follow the network -arc model

**Solution & Conclusion:**

Yes, After adding the network having double arrowed the optimal solution remains the same i.e. 198. It means that even if the there are two way networks or doublearrowed networks the optimal solution remains the same as with a single arrowed network. The Minimum cost replacement stragegy is good way to make sure that that when we enter approporiate flows for the strategy it replaces the machine in quarters, The flows automatically satify the flow balance constraunts. The total cost remails the same .

**W&A Chapter 5**

1. **Allied Freight**

**Problem Statement:**

Allied Freight supplies goods to three customers, who each require 30 units. The company has two ware- houses. In warehouse 1, 40 units are available, and in warehouse 2, 30 units are available. The costs of shipping one unit from each warehouse to each customer are shown in the file P05\_67.xlsx. There is a penalty for each unsatisfied customer unit of demand—with customer 1, a penalty cost of $90 is incurred; with customer 2, $80; and with customer 3, $110.

1. Determine how to minimize the sum of penalty and shipping costs.
2. Use SolverTable to see how a change in the unit penalty cost of customer 3 affects the optimal cost.
3. Use SolverTable to see how a change in the capacity of warehouse 2 affects the optimal cost.

**Data Sources:**4Edition Q67 **or** 3Edition Q67 - Data [P05\_67.xlsx](https://sit.instructure.com/courses/60732/files/10002669?wrap=1)

**Model Approach:** Network Modeling

**Solution & Conclusion:**

As per the given problem statement, to minimize the sum of penalty and shipping costs, we have given the constraints of allowed capacity of 40 and 30 units for availability and 30 units of the products for each customer as their demand, for the customers along with the penalty cost that has been implied, we could find the optimal solution of - $3,000 to minimize the penalty and shipping cost for the customers.   
The sensitivity analysis also represents the Unit Penalty Cost for Customer 3 (cell $J$12) values along side, output cell(s) along top and the Capacity of warehouse 2 (cell $I$6) values along side, output cell(s) along top. The Optimal minimized penalty cost remains same even with the increase in unit demands.