(NewAge Pharmaceutical) NewAge Pharmaceuticals produces the drug NasaMist from four chemicals. Today, the company must produce 5000 pounds of the drug. The three active ingredients in NasaMist are A, B, and C. By weight, at least 7% of NasaMist must consist of A, at least 5% must consist of B, and at least 3% must consist of C. The cost per pound of each chemical and the amount of each active ingredient in one pound of each chemical are given in the file **P04\_48.xlsx**. At least 600 pounds of chemical 3 must be used. Determine the cheapest way of producing today’s batch of NasaMist.



**Discussion: -**

In these types of problems, we must blend various inputs together to produce desired outputs. NewAge company is using 4 types of chemicals to produce drug NasaMist. There are three ingredients in this drug. Each chemical will have certain percentage of ingredients. NasaMist drug is the output prepared by mixing these 4 chemicals, which means this drug contain the three ingredients as well. Our problem says that NasaMist drug should have at least certain percentage of these ingredients. From the problem we can understand that we can use these 4 chemicals to prepare a drug, but the output of the drug should have certain percentage of ingredients. So, our decision will be the amount of each input bended into output.

**Mathematical Model: -**

*Parameters (Inputs):*



*Decision Variables:*

*Calculated Variables:*

*Objective:*

*Constraints:*

Constraint 2 will make sure that final output(drug) has certain level of ingredients A, B, C. As the levels are given in percentage we need to multiply the value with the demand. As it is cost minimizing problem and cost is directly proportional on the weight of the chemical used, our optimal solution will make sure to use lower cost chemicals by keeping ingredient levels as constraint.

*Excel Implementation:* Please find the attached spreadsheet for solution. 

