Frequently Asked Questions

1. What are the kinds of variation we come across in transportation problem?
   Answer:
   While solving a transportation problem we often come across various variation s like unbalanced supply and demand, degeneracy and its resolution, alternative optimal solutions and prohibited transportation routes.

2. When does a feasible solution exist?
   Answer:
   For a feasible solution to exist, it is necessary that the total supply must equal the total demand. That is, for a total supply is equal to total demand.

3. What happens when total supply exceeds total demand?
   Answer:
   If the total supply exceeds the total demand, then an additional column (called a dummy demand centre) can be added to the transportation table in order to absorb the excess supply.

4. What is the unit transportation cost for the dummy cells?
   Answer:
   The unit transportation cost for the cells in this column is set equal to zero because these represent product items that are not being made and not being sent.

5. What happens when total demand exceeds the total supply?
   Answer:
   If the total demand exceeds the total supply, a dummy row (called a dummy supply centre) can be added to the transportation table to account for the excess demand quality. The unit transportation here also for the cells in the dummy row is set equal to zero.

6. What is a basic feasible solution?
   Answer:
   A basic feasible solution for the general transportation problem must consist of exactly m + n - 1 positive allocation in independent positions in the transportation table.

7. When solution is called degenerate?
   Answer:
   A solution will only be called degenerate if the number of occupied cells is less than the required number, m + n - 1.

8. Why should we degenerate the solutions?
   Answer:
   In degenerate cases, the current solution cannot be improved upon because it is not possible to draw a closed path for every occupied cell. Also the values of dual variables u_i and V_j that are used to test the optimality cannot be computed. Thus, we need to remove the degeneracy in order to improve the given solution.

9. What are the two stages of degeneracy?

   Answer:

   The degeneracy in the transportation problems may occur at two stages:

   a. When obtaining an initial basic feasible solution we may have less than m plus n minus 1 allocation
   b. At any stage while moving towards optimal solution. This happens when two or more occupied cells with the same minimum allocation are simultaneously unoccupied

10. How do we solve degeneracy in the initial solution?

    Answer:

    To resolve degeneracy at the initial solution, we proceed by allocating a very small quantity close to zero to one or more (if needed) unoccupied cells so as to get m + n - 1 number of occupied cells. This amount is denoted by a greek letter ε (epsilon) or Δ (delta).

11. How do we solve degeneracy in iteration?

    Answer:

    To resolve degeneracy, which occurs during optimality test, the quantity may be allocated to one or more cells that have recently been unoccupied; to have m + n - 1 number of occupied cells in the new solution.

12. When do we say there is an alternative optimal solution?

    Answer:

    If an unoccupied cell in an optimal solution has an opportunity cost of zero, an alternative optimal solution can be formed with another set of allocations, without increasing the total transportation cost.

13. What is prohibited transportation problem?

    Answer:

    Situations like road hazards (snow, flood, etc), traffic regulations, etc may arise because of which it is usually not possible to transport goods from certain sources to certain destinations. Such type of problems can be handled but by assigning a very large cost, say M (or ∞) to that route (or cell).

14. What is maximization transportation problem?

    Answer:

    Maximization transportation problem is used to solve the problems in which the objective is to maximize total value or benefit. That is instead of unit cost C_{ij}, the unit profit or payoff P_{ij} associated with each route (I, j) is given.

15. What is trans-shipment problem?

    Answer:

    In a transportation problem the shipment of a commodity takes place among sources and destinations. But instead of direct shipments to destinations, the commodity can be transported to a particular destinations through one or more intermediate or trans-shipment points. Each of these points, in turn supply to other points. Thus, when the

shipments pass from destination to destination and from source to source, we have a trans-shipment problem.