# PT-4 (1–15)

**1.How does cycling occur in the simplex method?**

* when the objective function is quadratic.
* When the tableau enters a sequence of operations that keep revisiting previous configurations.
* when there is no optimal solution.
* When the reduced costs are all zero.

**2.Which of the following is NOT an assumption of linear programming?**

* Proportionality.
* Certainty.
* Non-negativity.
* Quadratic relationship.

**3.What is the role of artificial variables in the simplex method?**

* To help in profit maximization.
* To deal with unbounded solutions.
* To provide a feasible starting solution when no other is available.
* To handle non-linear constraints.

**4.How is the revised simplex method different from the standard simplex method?**

* it works only for minimization problems.
* It does not require matrix inversion in its iterations.
* It uses a completely different set of pivot rules.
* it doesn’t work with basic feasible solutions.

**5.Which of the following is true regarding the dual simplex method?**

* it starts with an optimal solution and moves towards feasibility.
* It is another name for the Big M method.
* It starts with a feasible solution and moves towards optimality.
* it always results in an unbounded solution.

**6.What is the outcome when the simplex method concludes that a problem is infeasible?**

* Itimplies that no solution exists within the given constraints.
* It means that the problem has multiple optimal solutions.
* It suggests that the objective function is unbounded.
* It indicates that the problem is too complex to be solved.\

**7.How can redundancy of a constraint be identified in the simplex method?**

* If its removal does not alter the feasible region.
* Iifit always results in an infeasible solution.
* Ifthe associated slack variable has a coefficient of zero in the optimal solution.
* If the objective function value becomes negative.

**8.Which of the following statements about the revised simplex method is FALSE?**

* it avoids tabular representation.
* It uses matrix operations to determine directions of movement in the feasible region.
* it operates directly on the primal-dual pair of problems.
* it works directly with the original constraints.

**9.What is the primary motivation behind the dual simplex method?**

* Solving problems with unbounded solutions.
* Maximizing computational efficiency.
* Starting with an infeasible solution and moving towards feasibility.
* Handling large-scale problems with more than 10,000 variables.

**10.How do the primal and dual simplex methods differ in their basic approach?**

* The primal seeks optimality while the dual seeks feasibility.
* The primal focuses on constraints while the dual focuses on objective coefficients.
* The primal uses reduced costs, while the dual uses shadow prices.
* The primal operates on the original problem, while the dual operates on its transformed version.

**11.Which of the following is a primary use case for the revised simplex method?**

* Problems where the feasible region is easily visualized.
* Problems with a high degree of degeneracy.
* Large-scale linear programming problems.
* Problems with multiple optimal solutions.

**12.What is the role of Bland's Rule in the simplex method?**

* It avoids cycling by deterministic pivot selection.
* It optimizes the step size in each iteration.
* It identifies the entering and exiting variables simultaneously.
* It calculates shadow prices for each constraint.

**13.How does the bounded variable simplex method differ from the standard simplex method?**

* It works with a dual set of equations.
* It employs a different pivot selection rule.
* It handles variables that have upper and lower bounds.
* Ituses an entirely different mathematical formulation.

**14.What is the main advantage of the two-phase simplex method over the standard simplex method?**

* It guarantees global optimality.
* It handles bounded variables more efficiently.
* it starts with an artificial objective function to find a feasible solution.
* It operates on matrix forms, reducing computational requirements.

**15.How does degeneracy in the simplex method affect its performance?**

* It speeds up the algorithm by reducing the search space.
* It might lead to cycling and increased computational time.
* It simplifies the constraints and makes them linearly independent.
* It ensures a unique optimal solution for the problem.