1. Which technique is typically used to linearize a product of decision variables in optimization?

* Substitution
* Big M method
* Decomposition
* Quadratic approximation

2. What is the primary challenge when dealing with non-convex regions in relation to decision variables?

* Identifying global optima becomes difficult.
* Decision variables become irrelevant.
* The feasible region becomes unbounded.
* Constraints become linear.

3. How does the granularity of decision variables impact the search space of an optimization problem?

* It doesn't affect the search space.
* Finer granularity enlarges the search space.
* Coarser granularity reduces the complexity of the problem.
* Finer granularity ensures a global optimum.

4. Which of the following techniques allows decision variables to take on multiple values simultaneously in an optimization problem?

* Linearization
* Decomposition
* Multi-objective optimization
* Simulation-based optimization

5. What characteristic of decision variables directly affects the convexity or concavity of the feasible region?

* Their coefficients in the objective function
* Their relationships with other decision variables
* Their bounds
* Their types (continuous, discrete, etc.)

6. How do decision variables facilitate the representation of real-world problems in optimization models?

* By acting as placeholders for known data.
* By transforming all problems into linear systems.
* By encapsulating the aspects of the problem that can be controlled or changed.
* By ensuring the feasibility of the solutions.

7. Which of the following is NOT a characteristic of optimization problems?

* Objective function to be optimized.
* Decision variables that can be controlled.
* Constraints that must be satisfied.
* Random variables without specific bounds.

8. What is the primary goal of the warehouse location problem?

* Minimizing the total distance traveled.
* Maximizing the storage capacity.
* Optimizing the product mix.
* Minimizing the total costs of distribution and storage.

9. Which is NOT a real-world application of the warehouse problem?

* Determining the best locations for distribution centers for a retail chain.
* Finding the optimal path for a traveling salesman.
* Allocating products efficiently in a warehouse to reduce retrieval times.
* Identifying the right warehouse size for storing seasonal products.

11. What is the fundamental constraint often considered in warehouse location problems?

* Budget restrictions.
* Distance to the nearest urban center.
* Capacity of the warehouse.
* Proximity to suppliers.

12. Which of the following is a popular heuristic for the warehouse problem?

* Dijkstra’s algorithm.
* Floyd-Warshall algorithm.
* K-means clustering.
* Particle swarm optimization.

13. What challenge does the dynamic nature of demand pose to the warehouse optimization problem?

* It makes the problem linear.
* It requires continuous updates in solution approaches.
* It simplifies the objective function.
* It mandates the use of only exact algorithms.

14. How are facility location problems related to the warehouse problem?

* They both deal with retail chain management.
* They consider the optimal placement of facilities, including warehouses.
* They focus on vehicle routing optimization.
* They only relate in terms of product allocation.

15. Which of the following does NOT represent a constraint in a typical warehouse optimization problem?

* Maximum storage capacity.
* Minimum order quantity for products.
* Total cost of transportation.
* Maximum number of employees.