--Question Starting--
1. Consider the following two statements about the simplex method and integer programming in optimization:
Statement I: In the simplex method, if the solution space is unbounded, there exists at least one feasible solution that will maximize or minimize the objective function without bound.
Statement II: Integer programming problems can be solved using the simplex method by introducing additional constraints to ensure all variables take integer values.
(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct
Answer Key: 4
Solution:
? Statement I(Incorrect): While the simplex method can indicate an unbounded solution space, this does not guarantee the existence of a feasible solution that optimizes the objective function without bound, especially if no feasible solutions satisfy all constraints.
? Statement II(Correct): Integer programming generally requires specific algorithms like Branch and Bound or cutting planes because the simplex method alone cannot enforce integer constraints merely by adding additional constraints; the simplex method deals with continuous variables.
Hence, Option (4) is the right answer.

--Question Starting--
2. Consider the following statements related to distributed databases and client-server architectures:
Statement I: In a distributed database, data is stored in multiple locations, and the system appears as a single database to the user, enhancing data availability and reliability.
Statement II: Client-server architectures inherently support distributed databases by separating database functionality between client machines and servers, thus optimizing performance and resource allocation.
(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct
Answer Key: 4
Solution:
? Statement I(Incorrect): While it's true that distributed databases store data in multiple locations and aim to appear as a single system, this does not inherently enhance data availability and reliability without additional mechanisms like replication and failover strategies.
? Statement II(Correct): Client-server architectures do not inherently support distributed databases. They separate the processing between clients and servers, which can lead to performance benefits, but this separation alone does not equate to the support for distributed database functionalities.
Hence, Option (4) is the right answer.

--Question Starting--
3. Consider the following statements about network layer delivery and routing protocols:
Statement I: Direct network layer delivery occurs when the source and destination hosts are on the same network, requiring no intermediate router.
Statement II: Routing algorithms like OSPF and BGP utilize the shortest path first technique to determine the most efficient route, regardless of the network topology and administrative preferences.
(1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct
Answer Key: 2
Solution:
? Statement I(Correct): Direct delivery is indeed used when the source and destination are on the same

network, which means packets are sent directly without routing through an intermediate.
? Statement II(Incorrect): OSPF uses a shortest path first approach based on Dijkstra's algorithm, tailored for intradomain routing in IP networks. BGP, however, uses a path vector protocol that considers policy-based routing decisions, not just the shortest path, particularly important for interdomain routing.
Hence, Option (2) is the right answer.