3. Match the following concepts with their corresponding design principles or models:
1. Abstraction A. Focuses on hiding internal details and exposing only necessary parts
2. Modular Design B. Dividing a system into independent components with clear interfaces
3. Entity-Relationship Model C. Represents data and relationships in a structured manner
4. Layered Architecture D. Organizes system into hierarchical layers, each with specific responsibility
Choose the correct answer from the options given below:
(1) 1-A, 2-B, 3-C, 4-D
(2) 1-B, 2-A, 3-D, 4-C
(3) 1-A, 2-C, 3-B, 4-D
(4) 1-D, 2-B, 3-A, 4-C
Answer Key: 1
Solution:
? Abstraction: It involves hiding complex internal details and exposing only essential parts to reduce complexity.
? Modular Design: It emphasizes dividing a system into independent modules with well-defined interfaces to promote maintainability.
? Entity-Relationship Model: It structurally models data entities and their relationships, enabling systematic database design.
? Layered Architecture: It structures a system into hierarchical layers, each responsible for specific functions, facilitating separation of concerns.
Hence, Option (1) is the right answer.

4. Match the following planning methods with their characteristics:
1. Goal Stack Planning A. Plans are generated by maintaining a stack of goals and sub-goals
2. Hierarchical Planning B. Plans are constructed by decomposing high-level goals into sub-goals
3. STRIPS C. Uses a formal language to specify actions and goals for automated planning
4. Partial Order Planning D. Creates plans that specify only necessary ordering constraints
Choose the correct answer from the options given below:
(1) 1-B, 2-A, 3-C, 4-D
(2) 1-A, 2-B, 3-D, 4-C
(3) 1-C, 2-D, 3-A, 4-B
(4) 1-D, 2-C, 3-B, 4-A
Answer Key: 1
Solution:
? Goal Stack Planning: Maintains a stack of goals and sub-goals, resolving them in a last-in-first-out manner.
? Hierarchical Planning: Decomposes high-level goals into smaller, manageable sub-goals, enabling top-down plan construction.
? STRIPS: A formal language that allows for the specification of actions, preconditions, and effects, facilitating automated reasoning.
? Partial Order Planning: Generates plans with only the necessary ordering constraints, allowing flexibility in execution order.
Hence, Option (1) is the right answer.

5. Match the following data constraints and modeling concepts with their respective formal tools or rules:
1. Functional Dependency A. Used to express conditions that must always hold between data elements
2. Codd Rules B. Set of rules defining what constitutes a relational database system
3. Relational Algebra C. Formal language for querying and manipulating relational data
4. Relational Model Constraints D. Rules ensuring data integrity and schema consistency in relational databases
Choose the correct answer from the options given below:
(1) 1-A, 2-B, 3-C, 4-D

(2) 1-C, 2-D, 3-A, 4-B
(3) 1-B, 2-A, 3-D, 4-C
(4) 1-D, 2-C, 3-B, 4-A
Answer Key: 1
Solution:
? Functional Dependency: Expresses a relationship where certain data attributes determine others, essential for normalization.
? Codd Rules: A collection of thirteen rules that define the necessary features for a relational database system.
? Relational Algebra: A formal, procedural query language that provides operators for data manipulation.
? Relational Model Constraints: Constraints like primary key, foreign key, and integrity rules that maintain data consistency.
Hence, Option (1) is the right answer.