--Question Starting--
Match the following properties of groups with their corresponding algebraic implications:
1. Closure 2. Associativity 3. Existence of Identity 4. Existence of Inverses
A. For every a, b in G, a·b is in G
B. For all a, b, c in G, (a·b)·c = a·(b·c)
C. There exists e in G such that for all a in G, a·e = a
D. For each a in G, there exists a^{-1} in G such that a·a^{-1} = e
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:
? Closure (A): Ensures the operation stays within the set.
? Associativity (B): The grouping of operations does not affect the outcome.
? Identity (C): There is an element that leaves others unchanged under the operation.
? Inverses (D): Each element has a corresponding inverse that yields the identity when combined.
Hence, Option (1) is the right answer.

--Question Starting--
Match the following graph types with their defining properties:
1. Tree 2. Bipartite Graph 3. Complete Graph 4. Eulerian Path
A. A connected graph in which any two vertices are connected by exactly one path
B. A graph whose vertices can be divided into two disjoint sets such that every edge connects a vertex from one set to the other
C. A graph where every pair of vertices is connected by an edge
D. A trail that uses every edge exactly once and starts and ends at the same vertex
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-B, 3-C, 4-D
(4) 1-C, 2-D, 3-A, 4-B
Answer Key: 3
Solution:
? Tree (A): A minimal connected acyclic graph.
? Bipartite Graph (B): Vertices split into two sets with edges only between sets.
? Complete Graph (C): Every pair of vertices is connected.
? Eulerian Path (D): A trail covering all edges exactly once, returning to start if Eulerian circuit.
Hence, Option (3) is the right answer.