1. What is the maximum number of edges in a simple undirected graph with 8 vertices?
   1. 20
   2. **28**
   3. 32
   4. 36
2. Which data structure is commonly used to represent an undirected graph?
   1. **Array of adjacency lists**
   2. Matrix multiplication
   3. Priority queue
   4. Stack
3. Which of the following is NOT a connectivity-based algorithm for undirected graphs?
   1. Depth-First Search (DFS)
   2. Breadth-First Search (BFS)
   3. Kruskal's algorithm
   4. **Dijkstra's algorithm**
4. In an undirected graph, a bridge is an edge that, when removed, increases the number of:
   1. Vertices
   2. Edges
   3. **Connected components**
   4. Cycles
5. Which graph traversal algorithm can be used to detect cycles in an undirected graph?
   1. **DFS**
   2. BFS
   3. Dijkstra's algorithm
   4. Prim's algorithm
6. In an undirected graph, if there are no back edges during DFS traversal, then:
   1. **The graph has no cycles**
   2. The graph is complete
   3. The graph is a tree
   4. The graph is bipartite
7. Which of the following is NOT a cycle detection algorithm for an undirected graph?
   1. **Floyd-Warshall algorithm**
   2. Tarjan's algorithm
   3. Union-Find algorithm
   4. Depth-First Search (DFS)
8. Which algorithm can be used to find the minimum spanning tree of a connected, undirected graph?
   1. Bellman-Ford algorithm
   2. Floyd-Warshall algorithm
   3. **Kruskal's algorithm**
   4. Dijkstra's algorithm
9. Topological sorting is only applicable to:
   1. **Directed acyclic graphs (DAGs)**
   2. Complete graphs
   3. Bipartite graphs
   4. Strongly connected components
10. Which algorithm is commonly used to perform topological sorting on a directed acyclic graph?
    1. Dijkstra's algorithm
    2. Prim's algorithm
    3. **Kahn's algorithm**
    4. Kruskal's algorithm
11. In a topologically sorted graph, for every directed edge (u, v), vertex u comes:
    1. **Before vertex v**
    2. After vertex v
    3. At the same position as vertex v
    4. None of the above
12. If a graph has a cycle, it cannot have a valid topological sorting.
    1. **True**
    2. False
13. The shortest cycle in an undirected graph can be found using:
    1. Dijkstra's algorithm
    2. **Floyd-Warshall algorithm**
    3. Prim's algorithm
    4. Bellman-Ford algorithm
14. Which property is essential for finding the shortest cycle using the Floyd-Warshall algorithm?
    1. **Negative edge weights**
    2. Positive edge weights
    3. Acyclic graph
    4. Complete graph
15. The length of the shortest cycle in a graph is also known as the:
    1. Diameter of the graph
    2. Radius of the graph
    3. **Girth of the graph**
    4. Span of the graph
16. In an undirected graph, what is the maximum number of edges in a cycle of length 'n'?
    1. n - 1
    2. **n**
    3. 2n
    4. 2n - 2
17. Which of the following is true for an undirected graph with n vertices and m edges?
    1. m < n
    2. m = n
    3. m > n
    4. **m can be anything**
18. What is the maximum number of edges in a connected acyclic undirected graph with n vertices?
    1. **n - 1**
    2. n
    3. 2n - 2
    4. (n \* (n - 1)) / 2
19. A graph in which every vertex is connected to every other vertex is called a:
    1. **Complete graph**
    2. Bipartite graph
    3. Cycle graph
    4. Tree
20. Which algorithm is used to find the strongly connected components in a directed graph?
    1. Kruskal's algorithm
    2. Dijkstra's algorithm
    3. **Tarjan's algorithm**
    4. Prim's algorithm
21. In a directed graph, back edges are used to detect cycles during:
    1. **Depth-First Search (DFS)**
    2. Breadth-First Search (BFS)
    3. Dijkstra's algorithm
    4. Prim's algorithm
22. The presence of a back edge during DFS traversal indicates the presence of a(n):
    1. Acyclic graph
    2. Bipartite graph
    3. Strongly connected component
    4. **Cycle**
23. Which algorithm can detect cycles in both directed and undirected graphs?
    1. Bellman-Ford algorithm
    2. Floyd-Warshall algorithm
    3. **Union-Find algorithm**
    4. Kruskal's algorithm
24. In a directed graph, if there is a cycle, then there is at least one:
    1. Sink vertex
    2. **Source vertex**
    3. Leaf vertex
    4. Root vertex
25. The topological sorting of a directed acyclic graph (DAG) is not unique.
    1. **True**
    2. False
26. Which of the following is an application of topological sorting?
    1. **Shortest path in weighted graphs**
    2. Finding bridges in graphs
    3. Cycle detection
    4. Breadth-First Search (BFS)
27. A directed graph with a cycle cannot have a valid topological sorting.
    1. **True**
    2. False
28. Which algorithm uses a stack to perform topological sorting of a DAG?
    1. Prim's algorithm
    2. Kruskal's algorithm
    3. **Depth-First Search (DFS)**
    4. Breadth-First Search (BFS)
29. Which of the following algorithms can be used to find the shortest cycle in a weighted graph?
    1. Dijkstra's algorithm
    2. **Floyd-Warshall algorithm**
    3. Bellman-Ford algorithm
    4. Kruskal's algorithm
30. The Floyd-Warshall algorithm finds the shortest paths between:
    1. **All pairs of vertices**
    2. Source and target vertices
    3. Vertices in the same connected component
    4. Leaf nodes of the graph
31. The Floyd-Warshall algorithm cannot be applied if the graph contains:
    1. **Negative edge weights**
    2. Positive edge weights
    3. No cycles
    4. Only even cycles
32. The girth of a graph is defined as the:
    1. **Shortest cycle in the graph**
    2. Longest cycle in the graph
    3. Length of the longest path in the graph
    4. Distance between two farthest vertices