30 MCQs on Trees, Graphs, BFS and DFS

S No	Questions	Correct Answer
1.	**What is a node in a tree or graph called?** a) Vertex b) Edge c) Leaf d) Root	*a) Vertex*
2.	**Which of the following terms refers to a tree in which each node has at most two children?** a) Binary Tree b) AVL Tree c) Red-Black Tree d) B-Tree	*a) Binary Tree*
3.	**In a tree, what is the name of a node that has no children?** a) Vertex b) Leaf c) Root d) Branch	*b) Leaf*
4.	**What is a cycle in a graph?** a) A path from one vertex to another b) A path from a vertex back to itself c) A path containing all vertices exactly once d) A path containing no edges	*b) A path from a vertex back to itself*
5.	**Which of the following statements about trees is true?** a) A tree can have multiple roots. b) A tree can have multiple leaves. c) A tree can have cycles. d) A tree can have exactly n - 1 edges, where n is the number of vertices.	*d) A tree can have exactly n - 1 edges, where n is the number of vertices.*
6.	**What is the degree of a vertex in a graph?** a) The number of edges incident to the vertex b) The number of vertices adjacent to the vertex c) The number of paths from the vertex to other vertices d) The number of cycles containing the vertex	*a) The number of edges incident to the vertex*
7.	**Which of the following terms describes a graph in which each edge has a direction?** a) Directed Graph b) Undirected Graph c) Weighted Graph d) Bipartite Graph	*a) Directed Graph*

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8.	**What is the height of a tree?** a) The number of vertices in the tree b) The number of edges in the longest path from the root to a leaf c) The depth of the root node d) The number of levels in the tree	*b) The number of edges in the longest path from the root to a leaf*
9.	**Which of the following terms describes a graph in which there is a path between every pair of vertices?** a) Connected Graph b) Disconnected Graph c) Complete Graph d) Bipartite Graph	*c) Complete Graph*
10.	**What is the degree of a leaf node in a tree?** a) 0 b) 1 c) 2 d) Depends on the type of tree	*a) 0*
11.	**What does BFS stand for?** a) Best-First Search b) Breadth-First Search c) Binary-First Search d) Basic-First Search	*b) Breadth-First Search*
12.	**What data structure is typically used in implementing BFS?** a) Stack b) Queue c) Linked List d) Heap	*b) Queue*
13.	**In BFS, which vertex is visited first?** a) The vertex with the smallest value b) The vertex with the largest value c) The root vertex d) Randomly selected vertex	*c) The root vertex*
14.	**In BFS, which operation is performed on each vertex before visiting its adjacent vertices?** a) Enqueue b) Dequeue c) Push d) Pop	*b) Dequeue*

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15.	**What is the time complexity of BFS on an adjacency matrix representation of a graph with V vertices and E edges?** a) $O(V)$ b) $O(E)$ c) $O(V + E)$ d) $O(V \cdot E)$	*c) O(V+E)*
16.	**What does DFS stand for?** a) Directed-First Search b) Depth-First Search c) Distance-First Search d) Dual-First Search	*b) Depth-First Search*
17.	**Which data structure is typically used in implementing DFS?** a) Stack b) Queue c) Linked List d) Heap	*a) Stack*
18.	**In DFS, which vertex is visited first?** a) The vertex with the smallest value b) The vertex with the largest value c) The root vertex d) Randomly selected vertex	*d) Randomly selected vertex*
19.	**In DFS, which operation is performed on each vertex before visiting its adjacent vertices?** a) Enqueue b) Dequeue c) Push d) Pop	*c) Push*
20.	**What is the time complexity of DFS on an adjacency list representation of a graph with V vertices and E edges?** a) $O(V)$ b) $O(E)$ c) $O(V + E)$ d) $O(V \cdot E)$	**c)** *O(V+E)*
21.	**Which of the following traversal techniques is used to find the shortest path in an unweighted graph?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*a) BFS*
22.	**Which traversal technique can be used to detect cycles in a graph?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*b) DFS*

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23.	**Which traversal technique is typically used to check for bipartite graphs?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*a) BFS*
24.	**Which traversal technique is used for topological sorting of a directed acyclic graph (DAG)?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*b) DFS*
25.	**Which traversal technique is preferred for finding connected components in a graph?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*b) DFS*
26.	**In BFS, which data structure is used to keep track of visited vertices?** a) Stack b) Queue c) Linked List d) Heap	*b) Queue*
27.	**In DFS, what is the maximum depth reached during traversal called?** a) Maximum depth b) Maximum level c) Maximum height d) Maximum length	*c) Maximum height*
28.	**Which traversal technique is more memory efficient for large graphs?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*b) DFS*
29.	**Which traversal technique is used for finding strongly connected components in a graph?** a) BFS b) DFS c) Both BFS and DFS d) Neither BFS nor DFS	*b) DFS*
30.	**Which traversal technique is used for solving puzzles and games, such as Sudoku and mazes?** a) BFS c) Both BFS and DFS b) DFS d) Neither BFS nor DFS	*c) Both BFS and DFS*