**SQL + Python Quiz**

**Duration:- 60 min**

**🔹 Section A: Algorithm Basics**

1. **Which of the following problems is best suited for the Greedy approach?**  
   a) 0/1 Knapsack  
   b) Matrix Chain Multiplication  
   c) Activity Selection Problem  
   d) Longest Common Subsequence
2. **Which is NOT true about the Divide and Conquer technique?**  
   a) Breaks problems into sub-problems  
   b) Merges sorted arrays  
   c) Suitable only for linear time solutions  
   d) Used in Quick Sort
3. **Dynamic Programming is preferred over recursion when:**  
   a) The problem is large  
   b) Overlapping sub-problems exist  
   c) Greedy fails  
   d) Time is not a constraint
4. **Brute force technique is best characterized by:**  
   a) Optimal substructure  
   b) Recursive backtracking  
   c) Exhaustive search  
   d) Memoization

**🔹 Section B: Data Structures Basics**

1. **Which data structure provides constant time access to elements by index?**  
   a) Array  
   b) Linked List  
   c) Stack  
   d) Queue
2. **Which of the following is not a LIFO structure?**  
   a) Call Stack  
   b) Queue  
   c) Stack  
   d) Recursion
3. **Which data structure allows insertion from one end and deletion from the other?**  
   a) Stack  
   b) Queue  
   c) Deque  
   d) Array

**🔹 Section C: Sorting Techniques**

1. **Which of the following sorting algorithms has the best average-case performance?**  
   a) Bubble Sort  
   b) Insertion Sort  
   c) Merge Sort  
   d) Selection Sort
2. **Quick sort fails to provide O(n log n) performance when:**  
   a) Array is already sorted  
   b) Median is chosen as pivot  
   c) Pivot is random  
   d) Array has duplicate values
3. **Which sorting technique is based on the concept of "divide and merge"?**  
   a) Selection Sort  
   b) Merge Sort  
   c) Insertion Sort  
   d) Quick Sort

**🔹 Section D: Searching Techniques**

1. **Binary search is applicable only when:**  
   a) Data is unsorted  
   b) Data is sorted  
   c) Data is in a stack  
   d) Data contains strings
2. **The time complexity of linear search is:**  
   a) O(log n)  
   b) O(1)  
   c) O(n)  
   d) O(n²)

**🔹 Section E: Tree Structures**

1. **Which of the following trees maintains a balanced height after every operation?**  
   a) Binary Tree  
   b) AVL Tree  
   c) BST  
   d) N-ary Tree
2. **In-order traversal of a binary search tree results in:**  
   a) Random order  
   b) Sorted order  
   c) Post-order sequence  
   d) Descending order
3. **What is the maximum number of children a node can have in a Binary Tree?**  
   a) 1  
   b) 2  
   c) 3  
   d) Unlimited

**🔹 Section F: Agile and Scrum**

1. **Which of the following best describes Agile?**  
   a) Waterfall methodology  
   b) A set of tools  
   c) Iterative and incremental development  
   d) Traditional project management
2. **The Scrum Master is primarily responsible for:**  
   a) Managing the team’s budget  
   b) Coaching the team and removing impediments  
   c) Writing code  
   d) Assigning tasks to developers
3. **TRELLO is mostly used for:**  
   a) Coding IDE  
   b) Database Management  
   c) Task Tracking and Collaboration  
   d) Software Testing
4. **Which SDLC model emphasizes detailed documentation and minimal client interaction?**  
   a) Spiral Model  
   b) Agile Model  
   c) Waterfall Model  
   d) V-Model

**🔹 Section G: Bonus Mixed Concept**

1. **Which combination is best for solving the shortest path in a weighted graph with non-negative weights?**  
   a) Brute Force + DFS  
   b) BFS + Memoization  
   c) Greedy + Dijkstra’s Algorithm  
   d) Dynamic Programming + Quick Sort

**✅ Advanced Level MCQ Quiz (70 Questions)**

**Topics: Algorithm Basics, Data Structures, Sorting & Searching, Trees, Agile, Scrum, SQL (DML, Joins, Subqueries, Normalization), Python (Basics, Control Flow, OOP, Functions, Exception Handling)**

**🔹 Section 1: Algorithm Basics (Q1–10)**

1. Greedy algorithms work best when a problem exhibits:  
   a) Overlapping subproblems  
   b) Optimal substructure and greedy choice property  
   c) Backtracking  
   d) Recursion
2. Which technique is most effective for problems like Fibonacci using memoization?  
   a) Divide and Conquer  
   b) Brute Force  
   c) Greedy  
   d) Dynamic Programming
3. The divide and conquer approach is used in:  
   a) Bubble Sort  
   b) Selection Sort  
   c) Merge Sort  
   d) Insertion Sort
4. Brute-force algorithm for pattern matching in text searches:  
   a) KMP Algorithm  
   b) Rabin-Karp  
   c) Naive Approach  
   d) Boyer-Moore
5. Dynamic programming approach stores:  
   a) Entire input  
   b) Solutions to subproblems  
   c) Output in trees  
   d) Search indexes
6. Which of the following problems is not suitable for greedy?  
   a) Huffman Coding  
   b) Fractional Knapsack  
   c) 0/1 Knapsack  
   d) Prim’s Algorithm
7. Divide and conquer recursively splits the problem into:  
   a) Single input  
   b) Sub-problems  
   c) Non-recursive loops  
   d) Memory blocks
8. Dynamic Programming avoids:  
   a) Repeating subproblems  
   b) Loop iterations  
   c) Base case solutions  
   d) Recursive steps
9. Which strategy tries all possibilities?  
   a) Dynamic  
   b) Greedy  
   c) Divide and Conquer  
   d) Brute Force
10. Time complexity of Fibonacci using DP (bottom-up)?  
    a) O(n²)  
    b) O(log n)  
    c) O(n)  
    d) O(2^n)

**🔹 Section 2: Data Structures (Q11–20)**

1. Which structure uses LIFO?  
   a) Queue  
   b) Array  
   c) Stack  
   d) Linked List
2. Linked lists are preferred over arrays when:  
   a) Random access is needed  
   b) Memory is limited  
   c) Frequent insertions/deletions occur  
   d) Fixed size is needed
3. Which data structure allows insertion from both ends?  
   a) Queue  
   b) Stack  
   c) Deque  
   d) List
4. Which is best for recursion call tracking?  
   a) Queue  
   b) Stack  
   c) Tree  
   d) Heap
5. Arrays have time complexity O(1) for:  
   a) Insertion  
   b) Deletion  
   c) Indexing  
   d) Searching
6. Queue follows:  
   a) LIFO  
   b) FILO  
   c) FIFO  
   d) Circular logic
7. To implement undo in an app, use:  
   a) Array  
   b) Queue  
   c) Stack  
   d) Graph
8. Linked list traversal time complexity:  
   a) O(1)  
   b) O(n)  
   c) O(log n)  
   d) O(n log n)
9. Which structure is linear?  
   a) Tree  
   b) Graph  
   c) Array  
   d) Heap
10. Which supports priority element retrieval?  
    a) Queue  
    b) Stack  
    c) Priority Queue  
    d) Linked List

**🔹 Section 3: Sorting & Searching (Q21–30)**

1. Best case for Bubble Sort?  
   a) O(n)  
   b) O(n log n)  
   c) O(n²)  
   d) O(log n)
2. Which sort is non-comparative?  
   a) Selection  
   b) Radix  
   c) Merge  
   d) Quick
3. Binary search requires:  
   a) Hash table  
   b) Sorted array  
   c) Unsorted array  
   d) Tree
4. Which search method is linear?  
   a) Binary  
   b) Hash  
   c) Linear  
   d) B-tree
5. Quick sort worst case occurs when:  
   a) Elements are random  
   b) All elements are same  
   c) Already sorted  
   d) All options
6. Merge Sort space complexity:  
   a) O(1)  
   b) O(n)  
   c) O(log n)  
   d) O(n log n)
7. Selection sort compares elements to:  
   a) First  
   b) Middle  
   c) Minimum  
   d) Last
8. Quick sort is:  
   a) Stable  
   b) In-place  
   c) Iterative only  
   d) Heap-based
9. Which has worst case O(n²)?  
   a) Merge  
   b) Quick  
   c) Bubble  
   d) Radix
10. Which is not a comparison-based sort?  
    a) Merge  
    b) Radix  
    c) Selection  
    d) Heap

**🔹 Section 4: Trees (Q31–40)**

1. Full binary tree has:  
   a) All nodes with two children  
   b) All nodes with one child  
   c) Root only  
   d) Leaves only
2. AVL Tree ensures:  
   a) Sorted data  
   b) Duplicate entries  
   c) Balanced height  
   d) No children
3. BST right child always:  
   a) Smaller  
   b) Greater  
   c) Equal  
   d) Random
4. Pre-order traversal visits in order:  
   a) Left, Root, Right  
   b) Root, Left, Right  
   c) Left, Right, Root  
   d) Root, Right, Left
5. Which tree allows self-balancing?  
   a) BST  
   b) AVL  
   c) Binary  
   d) Threaded
6. In a tree, level order traversal uses:  
   a) Stack  
   b) Queue  
   c) Recursion  
   d) Array
7. Height of a tree with one node:  
   a) 0  
   b) 1  
   c) -1  
   d) Undefined
8. Inorder traversal of BST gives:  
   a) Pre-order  
   b) Reverse  
   c) Sorted list  
   d) None
9. A complete binary tree is:  
   a) All nodes filled  
   b) Height-balanced  
   c) All leaves equal level  
   d) Any binary tree
10. Number of null links in a binary tree with n nodes:  
    a) n  
    b) n-1  
    c) n+1  
    d) 2n

**🔹 Section 5: Agile & Scrum (Q41–50)**

1. Agile delivers:  
   a) Final product only  
   b) Early and continuous delivery  
   c) Strict documentation  
   d) Delayed updates
2. SDLC stands for:  
   a) System Defined Life Cycle  
   b) Software Design Life Cycle  
   c) Software Development Life Cycle  
   d) Software Debug Life Cycle
3. Agile promotes:  
   a) Heavy documentation  
   b) End delivery  
   c) Iterative delivery  
   d) Zero customer interaction
4. Scrum roles include:  
   a) Product Owner, Tester  
   b) Developer, Scrum Master, Product Owner  
   c) DBA, UX  
   d) CEO
5. TRELLO is used for:  
   a) Writing Python code  
   b) Project collaboration  
   c) Database query  
   d) Test automation
6. Traditional model SDLC is:  
   a) Agile  
   b) Waterfall  
   c) Spiral  
   d) Scrum
7. Stand-up meetings in Scrum are:  
   a) Daily  
   b) Weekly  
   c) Monthly  
   d) Annually
8. Which is an Agile methodology?  
   a) Waterfall  
   b) V-Model  
   c) Scrum  
   d) Spiral
9. Sprint duration is usually:  
   a) 1 day  
   b) 1-4 weeks  
   c) 1 month  
   d) 2 months
10. Product backlog is maintained by:  
    a) Scrum Master  
    b) Product Owner  
    c) Developer  
    d) Tester

**🔹 Section 6: SQL + Python + OOP (Q51–70)**

1. SQL JOIN that returns only matching rows:  
   a) LEFT JOIN  
   b) FULL JOIN  
   c) INNER JOIN  
   d) CROSS JOIN
2. 2NF removes:  
   a) Transitive dependency  
   b) Partial dependency  
   c) Multivalued dependency  
   d) Redundancy
3. DROP TABLE removes:  
   a) Rows only  
   b) Structure only  
   c) Rows + Structure  
   d) Indexes only
4. Which clause is used for filtering?  
   a) GROUP BY  
   b) SELECT  
   c) WHERE  
   d) HAVING
5. Python default function arguments must:  
   a) Come first  
   b) Be last  
   c) Be global  
   d) Be required
6. lambda in Python is used for:  
   a) Looping  
   b) Recursion  
   c) Anonymous function  
   d) Decorators
7. Which keyword raises exceptions in Python?  
   a) throw  
   b) raise  
   c) error  
   d) except
8. Which is a Python set method?  
   a) pop()  
   b) get()  
   c) discard()  
   d) append()
9. OOP access specifier for private variable:  
   a) \_var  
   b) \_\_var  
   c) public  
   d) global
10. Polymorphism allows:  
    a) Multiple classes  
    b) Same function name, different behavior  
    c) No inheritance  
    d) One object per class
11. Self in Python represents:  
    a) A class  
    b) A method  
    c) The current object  
    d) Global variable
12. Which file mode in Python opens a file for reading only?  
    a) w  
    b) a  
    c) r  
    d) x
13. Which SQL keyword ensures non-null values?  
    a) CHECK  
    b) NOT NULL  
    c) UNIQUE  
    d) DEFAULT
14. Which SQL clause is used to group rows?  
    a) HAVING  
    b) GROUP BY  
    c) ORDER BY  
    d) SELECT
15. Function to fetch all rows in Python SQL query:  
    a) fetchall()  
    b) fetchone()  
    c) selectall()  
    d) get()
16. What is the output of type([]) in Python?  
    a) tuple  
    b) list  
    c) dict  
    d) set
17. import \* is used to:  
    a) Import selected items  
    b) Import all public names  
    c) Import nothing  
    d) Import private functions
18. Python file object’s read() method returns:  
    a) dict  
    b) list  
    c) string  
    d) int
19. SQL function to return current date:  
    a) GETDATE()  
    b) SYSDATE()  
    c) CURDATE()  
    d) NOW()
20. Python exception for invalid index:  
    a) TypeError  
    b) IndexError  
    c) NameError  
    d) ValueError