1. Which sorting algorithm has the best average-case time complexity?
   A) Merge Sort
   B) Bubble Sort
   C) Selection Sort
   D) Insertion Sort

2. Which algorithm selects a pivot and partitions the array?
   A) Quick Sort
   B) Merge Sort
   C) Bubble Sort
   D) Heap Sort

3. What is the worst-case time complexity of Quick Sort?
   A) O(n^2)
   B) O(n log n)
   C) O(n)
   D) O(log n)

4. What is the best-case time complexity of Quick Sort?
   A) O(n log n)
   B) O(n^2)
   C) O(n)
   D) O(log n)

5. What is the space complexity of Merge Sort?
   A) O(n)
   B) O(1)
   C) O(log n)
   D) O(n^2)

6. What is the time complexity of Bubble Sort in the worst case?
   A) O(n^2)
   B) O(n log n)
   C) O(n)
   D) O(log n)

7. What is the worst-case time complexity of Heap Sort?
   A) O(n log n)
   B) O(n^2)
   C) O(n)
   D) O(log n)

8. What is the average-case complexity of interpolation search?
   A) O(log log n)

B) O(n)
C) O(log n)
D) O(n^2)

9. Which sorting algorithm works well in external sorting (large datasets on disk)?
   A) Merge Sort
   B) Quick Sort
   C) Bubble Sort
   D) Selection Sort

10. Which sorting algorithm divides array and recursively sorts subarrays?
    A) Merge Sort
    B) Heap Sort
    C) Bubble Sort
    D) Selection Sort

11. Which algorithm is generally faster in practice despite worst-case O(n^2)?
    A) Quick Sort
    B) Merge Sort
    C) Heap Sort
    D) Bubble Sort

12. Which algorithm is suitable for real-time systems due to O(n log n) worst-case?
    A) Merge Sort
    B) Quick Sort
    C) Heap Sort
    D) Bubble Sort

13. Which algorithm requires additional memory for merging?
    A) Merge Sort
    B) Heap Sort
    C) Quick Sort
    D) Insertion Sort

14. Which algorithm builds a max-heap to sort in ascending order?
    A) Heap Sort
    B) Quick Sort
    C) Bubble Sort
    D) Merge Sort

15. What is the advantage of Heap Sort over Merge Sort?
    A) In-place sorting
    B) Stability

C) Faster on small arrays
D) Less comparisons

16. Which algorithm is used in priority queues?
    A) Heap Sort
    B) Quick Sort
    C) Merge Sort
    D) Bubble Sort

17. Which is an efficient method for searching in a sparse array?
    A) Jump Search
    B) Binary Search
    C) Linear Search
    D) Interpolation Search

18. Which algorithm reduces unnecessary comparisons by using previous results?
    A) Insertion Sort
    B) Selection Sort
    C) Bubble Sort
    D) Quick Sort

19. Which sorting algorithm is based on partitioning the array?
    A) Quick Sort
    B) Merge Sort
    C) Heap Sort
    D) Bubble Sort

20. Which search algorithm has complexity O(1) for hash tables?
    A) Direct addressing
    B) Linear Search
    C) Binary Search
    D) Jump Search

21. Which sorting algorithm has O(n + k) complexity where k is range of elements?
    A) Counting Sort
    B) Merge Sort
    C) Quick Sort
    D) Heap Sort

22. Which sorting algorithm is suitable for linked lists and external memory?
    A) Merge Sort
    B) Heap Sort
    C) Quick Sort
    D) Selection Sort

23. What sorting technique is optimal for reverse sorted arrays?
    A) Insertion Sort
    B) Merge Sort
    C) Quick Sort
    D) Bubble Sort

24. Which search method is best for searching ranged data?
    A) Interpolation Search
    B) Binary Search
    C) Linear Search
    D) Jump Search

25. Which comparison-based sorting algorithm is non-adaptive?
    A) Selection Sort
    B) Insertion Sort
    C) Merge Sort
    D) Bubble Sort

26. Which sorting algorithm is in-place and has better cache performance in real systems?
    A) Quick Sort
    B) Bubble Sort
    C) Selection Sort
    D) Merge Sort

27. What is the principle behind choice of pivot in Quick Sort?
    A) Partitioning
    B) Counting
    C) Merging
    D) Selecting minimum

28. Algorithm that combines sorted subarrays?
    A) Merge Sort
    B) Quick Sort
    C) Heap Sort
    D) Selection Sort

29. What's the best sorting for data with a small range of integer values?
    A) Counting Sort
    B) Heap Sort
    C) Quick Sort
    D) Merge Sort

30. Which algorithm is recommended when frequency of elements is more important than order?
    A) Counting Sort
    B) Bubble Sort
    C) Heap Sort
    D) Merge Sort