1. What is a hash function?
A) Maps input data to a fixed-size value
B) Searches an element linearly
C) Sorts data
D) Compresses data
Answer: A

2. Which collision resolution technique uses a linked list at each hash index?
A) Chaining
B) Linear Probing
C) Quadratic Probing
D) Double Hashing
Answer: A

3. Which collision resolution method searches sequentially for next available slot?
A) Linear Probing
B) Chaining
C) Separate Chaining
D) Double Hashing
Answer: A

4. What is load factor in hashing?
A) n / m (number of elements / table size)
B) n * m
C) m / n
D) n^2 / m
Answer: A

5. Which heap maintains smallest element at root?
A) Min-Heap
B) Max-Heap
C) BST
D) AVL
Answer: A

6. Which heap maintains largest element at root?
A) Max-Heap
B) Min-Heap
C) BST
D) AVL
Answer: A

7. What is time complexity for inserting into a heap?
A) O(log n)

B) O(n)
C) O(1)
D) O(n log n)
Answer: A

8. What is time complexity for extracting min or max from heap?
A) O(log n)
B) O(n)
C) O(1)
D) O(n log n)
Answer: A

9. Which heap is used in priority queues?
A) Min-Heap or Max-Heap
B) BST
C) AVL
D) Linear array
Answer: A

10. What is primary purpose of hash table?
A) Fast lookup, insert, delete
B) Sorting
C) DFS traversal
D) BFS traversal
Answer: A

11. Which heap operation maintains heap property after insertion?
A) Heapify-up
B) Heapify-down
C) Linear search
D) Merge
Answer: A

12. Which heap operation maintains heap after deletion of root?
A) Heapify-down
B) Heapify-up
C) Linear search
D) Merge
Answer: A

13. Which type of hash function uses division method?
A) h(k) = k mod m
B) h(k) = k^2
C) h(k) = sum of digits

D) h(k) = k + 1
Answer: A

14. Which type of hash function uses multiplication method?
A) h(k) = floor(m * (k*A mod 1))
B) h(k) = k mod m
C) h(k) = k + 1
D) h(k) = sum of digits
Answer: A

15. Which hashing method reduces clustering?
A) Double Hashing
B) Linear Probing
C) Chaining
D) Quadratic Probing
Answer: A

16. Which heap is complete binary tree?
A) All heaps (min/max)
B) BST
C) AVL
D) Graph
Answer: A

17. Which collision resolution method is preferred in dynamic table sizes?
A) Chaining
B) Linear Probing
C) Quadratic Probing
D) Double Hashing
Answer: A

18. What is primary disadvantage of open addressing?
A) Clustering
B) Requires extra memory
C) Slower access
D) No deletion
Answer: A

19. Which heap is used in heap sort?
A) Max-Heap
B) Min-Heap
C) BST
D) AVL
Answer: A

20. Which hashing method allows multiple elements at same index?
A) Chaining
B) Linear Probing
C) Quadratic Probing
D) Double Hashing
Answer: A

21. Which heap operation has O(n) complexity?
A) Build Heap
B) Insert
C) Delete Root
D) Extract Min/Max
Answer: A

22. Which collision resolution method uses formula (h(k) + i^2) % m?
A) Quadratic Probing
B) Linear Probing
C) Chaining
D) Double Hashing
Answer: A

23. Which is true for perfect hash function?
A) No collisions
B) Multiple collisions
C) Linear search
D) Heap-based
Answer: A

24. Which type of heap is suitable for implementing min-priority queue?
A) Min-Heap
B) Max-Heap
C) BST
D) AVL
Answer: A

25. Which is used in Dijkstra’s algorithm for selecting minimum distance node?
A) Min-Heap
B) Max-Heap
C) BST
D) Linear array
Answer: A

26. What is primary issue in hashing?

A) Collisions
B) Sorting
C) Traversal
D) Recursion
Answer: A

27. Which method reduces primary clustering?
A) Quadratic Probing
B) Linear Probing
C) Chaining
D) Double Hashing
Answer: A

28. Which method reduces secondary clustering?
A) Double Hashing
B) Linear Probing
C) Quadratic Probing
D) Chaining
Answer: A

29. What is the worst-case time complexity of search in hash table with chaining?
A) O(n)
B) O(log n)
C) O(1)
D) O(n log n)
Answer: A

30. What is average-case complexity for hash table search?
A) O(1)
B) O(log n)
C) O(n)
D) O(n log n)
Answer: A

31. Which heap property is always maintained?
A) Parent ≥ Children (Max-Heap) or Parent ≤ Children (Min-Heap)
B) Random order
C) Inorder sequence
D) Level-order
Answer: A

32. Which heap operation is used in heap sort repeatedly?
A) Extract Max
B) Insert

C) Linear search
D) BFS
Answer: A

33. What is advantage of chaining over open addressing?
A) Handles load factor >1
B) Uses less memory
C) Faster insertions
D) No deletions
Answer: A

34. Which collision resolution technique needs prime table size?
A) Double Hashing
B) Linear Probing
C) Chaining
D) Quadratic Probing
Answer: A

35. Which heap operation takes O(log n) time?
A) Insert, Delete
B) Build heap
C) Linear search
D) Traversal
Answer: A

36. What is a perfect hash table?
A) No collisions for given keys
B) Multiple collisions
C) Linear search
D) Heap-based
Answer: A

37. Which data structure is used for implementing priority queues efficiently?
A) Heap
B) BST
C) Linked List
D) Array
Answer: A

38. Which heap allows finding max element in O(1) time?
A) Max-Heap
B) Min-Heap
C) BST
D) AVL

Answer: A

39. Which hash table implementation allows easy resizing?
A) Chaining
B) Open addressing
C) Linear probing
D) Quadratic probing
Answer: A

40. Which heap is complete binary tree?
A) All heaps
B) BST
C) AVL
D) Graph
Answer: A

41. Which heap is better for implementing Dijkstra's algorithm?
A) Min-Heap
B) Max-Heap
C) Linear array
D) BST
Answer: A

42. Which hash table collision method uses linked lists?
A) Chaining
B) Linear Probing
C) Quadratic Probing
D) Double Hashing
Answer: A

43. Which hashing method spreads keys uniformly using multiplication?
A) Multiplication Method
B) Division Method
C) Linear Probing
D) Chaining
Answer: A

44. Which is disadvantage of chaining?
A) Extra memory for pointers
B) Slow search
C) Sorting problem
D) Traversal
Answer: A

45. Which heap operation is needed after removing root?
A) Heapify-down
B) Heapify-up
C) Linear search
D) Build
Answer: A

46. Which hashing method is sensitive to table size being prime?
A) Division Method
B) Multiplication Method
C) Chaining
D) Linear Probing
Answer: A

47. Which is true for binary heap?
A) Complete binary tree with heap property
B) BST
C) AVL
D) Graph
Answer: A

48. Which hashing collision method is good for small load factor?
A) Linear Probing
B) Chaining
C) Double Hashing
D) Quadratic Probing
Answer: A

49. Which heap property ensures O(log n) insert and delete?
A) Heap property (Min/Max)
B) Linear array
C) BST property
D) AVL property
Answer: A

50. Which hashing technique avoids clustering using secondary hash?
A) Double Hashing
B) Linear Probing
C) Chaining
D) Quadratic Probing
Answer: A