Queue Data Structure: Multiple Choice Questions

Assessment Level: Intermediate
Total Questions: 10
Time Limit: 30 minutes
Instructions: Select the best answer for each question. Write your answers on a separate sheet.

Question 1: FIFO Principle

Which of the following best describes the FIFO principle used in queues?

A) Last element added is the first element removed
B) First element added is the first element removed
C) Elements are removed randomly
D) Elements are removed based on priority

Answer: B

Question 2: Queue Operations Complexity

What is the time complexity of the enqueue operation in a properly implemented queue using a linked list?

A) O(n)
B) O(log n)
C) O(1)
D) $O(n^2)$

Answer: C

Question 3: Implementation Comparison

Which queue implementation provides optimal space utilization by eliminating wasted gaps from removed elements?

A) Array-based queue
B) Circular queue
C) Stack
D) Linear array queue

Answer: B

Question 4: Real-World Application

A printer receives print jobs in sequence. Job A arrives first, then Job B, then Job C. In what order will these jobs be printed if the printer uses a queue data structure?

A) C, B, A
B) A, B, C
C) B, A, C
D) The order is random

Answer: B

Question 5: Queue Structure Components

In a queue, elements are added at the _____ and removed from the _____.

A) front, rear
B) rear, rear
C) rear, front
D) top, bottom

Answer: C

Question 6: Dequeue Operation on Empty Queue

What error or exception occurs when attempting to dequeue an element from an empty queue?

A) Queue overflow
B) Queue underflow
C) Stack exception
D) Memory leak

Answer: B

Question 7: BFS Algorithm

In which algorithm is a queue essential for achieving level-order traversal of a tree or graph?

A) Depth-First Search (DFS)
B) Breadth-First Search (BFS)
C) Binary search
D) Linear search

Answer: B

Question 8: Circular Queue Formula

In a circular queue, what formula is used to calculate the next index after incrementing?

A) (current + 1) × size
B) (current + 1) mod size
C) current + size
D) (current - 1) mod size

Answer: B

Question 9: Queue vs Stack

A browser's back button history uses a _____ while a printer's job queue uses a _____.

A) queue, stack
B) stack, queue
C) deque, priority queue
D) heap, linked list

Answer: B

Question 10: Disadvantage of Array-Based Queue

What is a significant disadvantage of using a simple array-based (linear) queue implementation?

A) It has no maximum capacity
B) Space waste from removed elements leaving gaps
C) It is impossible to implement
D) It requires no pointers

Answer: B

Answer Key Summary

Question	Answer	Topic
1	B	FIFO Principle
2	C	Time Complexity
3	B	Circular Queue
4	B	Queue Applications
5	C	Queue Structure
6	B	Queue Errors
7	B	Algorithms
8	B	Circular Queue Math
9	B	Queue vs Stack
10	B	Implementation Issues

Scoring Guide

- **9-10 Correct**: Excellent understanding of queue concepts
- **7-8 Correct**: Good understanding with minor gaps
- **5-6 Correct**: Moderate understanding, review key concepts
- **Below 5**: Review all queue topics thoroughly

Concepts Covered

- ✓ FIFO principle and order management
- ✓ Time complexity analysis
- ✓ Implementation types (array, circular, linked list)
- ✓ Real-world applications
- ✓ Queue vs Stack comparison
- ✓ Error handling and edge cases
- ✓ Algorithm applications (BFS)
- ✓ Mathematical operations in circular queues

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Difficulty Level: Intermediate
Perfect for: Self-assessment and understanding verification