Okay, here are 14 MCQs based on the provided text, following your specified format:

Question: What is the primary function of an Operating System (OS)?

A) To directly access hardware without any protection.

B) To act as a bridge between the user and hardware, managing resources efficiently.

C) To prevent application development.

D) To complicate system operations.

Correct Answer: B

Question: What happens when Mode Bit = 0?

A) User Mode is activated.

B) The system crashes.

C) Kernel Mode is activated, allowing full access to hardware and system instructions.

D) No operations can be executed.

Correct Answer: C

Question: In User Mode, what mechanism is used to request hardware operations?

A) Direct hardware operations are allowed.

B) Control is transferred to the kernel via system calls.

C) The OS automatically grants hardware access.

D) User applications directly access memory.

Correct Answer: B

Question: Which of the following is NOT shared by threads of the same process in a multithreading environment?

A) Memory (address space)

B) Files

C) Stack (used for function calls)

D) Signals and their handlers

Correct Answer: C

Question: Which of the following is a benefit of using threads?

A) Slower response to users.

B) Increased overhead compared to processes.

C) Faster context switching between threads.

D) Reduced system throughput.

Correct Answer: C

Question: In the Many-to-One multithreading model, what is a major drawback?

A) Allows multiple threads to run in parallel on multiprocessors.

B) Creating many threads incurs overhead, limited by the OS.

C) If one thread makes a blocking system call, the entire process is blocked.

D) Offers flexibility and avoids the blocking problem.

Correct Answer: C

Question: What is a Process Control Block (PCB)?

A) Part of the secondary memory that contains instructions to be executed.

B) The actual program code in execution.

C) A data structure that acts as the "identity card" of a process for the Operating System, storing its attributes.

D) A scheduler that chooses which process gets the CPU next.

Correct Answer: C

Question: What is the main role of the Long-Term Scheduler (Job Scheduler)?

A) To perform swap-out and swap-in operations between main memory and secondary memory.

B) To choose which process from the Ready Queue will get the CPU next.

C) To decide which new processes should be admitted into the system from secondary storage to main memory.

D) To give CPU control to the process chosen by the short-term scheduler.

Correct Answer: C

Question: What is the primary job of the Dispatcher in an OS?

A) Choosing the next process to run.

B) Allocating memory to new processes.

C) Performing a context switch, saving the current process state and loading the new process state.

D) Managing I/O requests.

Correct Answer: C

Question: What is "Turnaround Time" in CPU scheduling?

A) The total time a process spends waiting in the Ready Queue.

B) The time from arrival to first CPU execution.

C) The total CPU time required by a process for its execution.

D) The total time taken from arrival to completion of a process.

Correct Answer: D

Question: Which CPU scheduling algorithm can lead to the "Convoy Effect"?

A) Round Robin (RR)

B) Shortest Job First (SJF)

C) First Come First Serve (FCFS)

D) Priority Scheduling

Correct Answer: C

Question: What is the main goal of CPU scheduling?

A) Maximize the response time.

B) Minimize CPU utilization.

C) Maximize CPU utilization and minimize response time and waiting time of the processes.

D) Maximize the waiting time.

Correct Answer: C

Question: What is the purpose of using Semaphores in the Producer-Consumer problem?

A) To allow the producer to always add items to the buffer without restrictions.

B) To allow the consumer to always remove items from the buffer without restrictions.

C) To replace busy waiting with system calls to achieve mutual exclusion and synchronization between the producer and consumer.

D) Semaphores are not needed in the Producer-Consumer problem.

Correct Answer: C

Question: What is the concept of "Mutual Exclusion" in synchronization?

A) Multiple processes can access the critical section at the same time.

B) Processes can run concurrently, regardless of shared resources.

C) Only one process can be in the critical section at a time.

D) Processes are not affected by each other's execution.

Correct Answer: C