## L5 Synchronization

Here are 20 multiple-choice questions based on the operating systems scheduling concepts from the lecture material:

**1. What characterizes a CPU-bound process?**  
A) Frequent I/O operations with short CPU bursts  
B) Long CPU bursts with infrequent I/O waits  
C) Equal distribution of CPU and I/O operations  
D) Prioritizes user interaction  
**Answer:** B

**2. In preemptive scheduling, a process can transition directly from:**  
A) Running → Waiting  
B) Running → Ready  
C) Ready → Terminated  
D) Waiting → Ready  
**Answer:** B1

**3. Which metric is calculated as CompletionTime - ArrivalTime?**  
A) Waiting time  
B) Response time  
C) Throughput  
D) CPU utilization  
**Answer:** B1

**4. The convoy effect is most associated with which scheduling algorithm?**  
A) Round Robin  
B) Shortest Job First  
C) First-Come-First-Served  
D) Priority Scheduling  
**Answer:** C1

**5. In Round Robin scheduling, if there are 5 jobs in the ready queue and time quantum=20ms, what's the maximum wait time for any job?**  
A) 40ms  
B) 80ms  
C) 100ms  
D) 120ms  
**Answer:** B1

**6. What is the primary advantage of Shortest Remaining Time First (SRTF)?**  
A) Maximizes CPU utilization  
B) Minimizes average response time  
C) Ensures fairness among all jobs  
D) Reduces context switching overhead  
**Answer:** B1

**7. Which scheduling algorithm requires prior knowledge of job execution times?**  
A) FCFS  
B) RR  
C) SJF  
D) Multilevel Queue  
**Answer:** C1

**8. In exponential averaging for burst prediction (τₙ = αtₙ₋₁ + (1-α)τₙ₋₁), what does α=1 imply?**  
A) Only consider historical average  
B) Only consider most recent burst  
C) Equal weight to all bursts  
D) No prediction capability  
**Answer:** B1

**9. What is a key disadvantage of priority scheduling?**  
A) High context-switch overhead  
B) Difficulty in implementation  
C) Potential for starvation  
D) Poor CPU utilization  
**Answer:** C1

**10. Which scheduling system uses dynamic priority adjustment based on past behavior?**  
A) Multilevel Queue  
B) Round Robin  
C) Multilevel Feedback Queue  
D) FCFS  
**Answer:** C1

**11. For the job sequence P1(24ms), P2(3ms), P3(3ms) in FCFS order, what's the average waiting time?**  
A) 10ms  
B) 17ms  
C) 24ms  
D) 27ms  
**Answer:** B1

**12. What is the primary purpose of a time quantum in Round Robin?**  
A) Prevent CPU monopolization  
B) Prioritize I/O-bound processes  
C) Reduce job completion time  
D) Improve cache locality  
**Answer:** A1

**13. Which algorithm would be best for minimizing response time in an interactive system?**  
A) FCFS  
B) RR with small quantum  
C) SJF  
D) Multilevel Queue  
**Answer:** B1

**14. What scheduling characteristic does this diagram represent?**  
(Show Gantt chart with frequent context switches)  
A) FCFS  
B) SJF  
C) RR  
D) Priority  
**Answer:** C1

**15. Which statement about SJF is FALSE?**  
A) It minimizes average waiting time  
B) It requires prior knowledge of burst times  
C) It's always preemptive  
D) Can cause starvation of long jobs  
**Answer:** C1

**16. In MLFQ scheduling, what typically happens to a CPU-bound job?**  
A) Gets promoted to higher queues  
B) Maintains its initial priority  
C) Drops to lower priority queues  
D) Receives larger time quanta  
**Answer:** C1

**17. What percentage of CPU time is lost to context switching if quantum=25ms and switch cost=0.5ms?**  
A) 1%  
B) 2%  
C) 5%  
D) 10%  
**Answer:** B1

**18. Which two metrics are conflicting optimization goals?**  
A) CPU utilization vs Throughput  
B) Response time vs Waiting time  
C) Throughput vs Response time  
D) Fairness vs Starvation  
**Answer:** C1

**19. What scheduling method combines multiple queues with different priorities?**  
A) SRTF  
B) Multilevel Queue  
C) RR  
D) Exponential Queue  
**Answer:** B1

**20. Which scenario benefits most from SRTF?**  
A) Batch processing system  
B) Real-time system  
C) Interactive system with mixed job lengths  
D) Embedded system with fixed tasks  
**Answer:** C