School of Engineering and Applied Science
Ahmedabad University
EndSem (01/12/2025) CSE Sem V, CSE404/CSE332, Operating Systems

Max Marks : 20 Time : 40 minutes

Q. 1 Multi-Choice Questions. Select only one most appropriate answer. 25% negative for each wrong answer. **[20 questions, 10 Marks]**

1. Which of the scheduler is responsible for Ready/Suspend to Ready transition?
   a. Short term
   b. Long term
   c. Medium term
   d. None of the above

Answer : C

2. Which of the following includes actual execution time plus time spent waiting for resources, including the processor?
   a. Response time
   b. Turnaround time
   c. Service time
   d. Throughput

Answer : B

3. Which of the following is fair to both CPU and I/O bound processes ?
   a. FCFS
   b. RR without Auxiliary queue
   c. RR with Auxiliary queue
   d. All of the above

Answer : C

4. Which of the following is not a normal transition i.e. occurs very infrequently ?
   a. Ready -> Running
   b. Running -> Blocked
   c. Blocked -> Blocked/Suspend
   d. Running -> Ready/Suspend

Answer : D

5. Which of the following uses decision mode that is preemptive at arrival ?
   a. SRT
   b. RR
   c. Feedback
   d. SPN

Answer : A

6. Which of the following does not cause the internal fragmentation ?
   a. Fixed Partitioning
   b. Dynamic Partitioning
   c. Virtual memory Segmentation
   d. Dynamic partitioning and virtual memory segmentation

Answer : D

7. Which of the following resident set management needs to change number of frames allocated to a process from time to time to maintain its working set?
   a. Fixed allocation, Local replacement
   b. Variable allocation, Local replacement
   c. Fixed allocation, Global replacement
   d. Variable allocation, Global replacement

Answer : B

8. When a relationship between processes is "Cooperation by Sharing", which of the following is true ?
   a. Processes unaware of each other
   b. Processes indirectly aware of each other
   c. Processes directly aware of each other
   d. Can't say anything

Answer : C

9. Consider two processes T1 and T2 executing concurrently. T1 writes to a shared variable X while T2 reads X. No synchronization is used. Which of the following best describes the situation?
   a. A race condition may occur
   b. A deadlock will definitely occur
   c. Starvation will occur but no race condition
   d. The execution is deterministic and safe

Answer : A

10. Which of the following scenarios can lead to livelock rather than deadlock?
   a. Two processes wait indefinitely for each other's resources
   b. Processes hold resources and request additional ones
   c. Two processes continuously change their states in response to each other but make no progress
   d. A high-priority process preempts low-priority processes indefinitely

Answer : C

11. In the context of the producer–consumer problem with a bounded buffer, which combination ensures correctness?
   a. Mutex only
   b. Two semaphores: full and empty, but no mutex
   c. Spinlock + one semaphore
   d. A mutex + two semaphores (full, empty)

Answer : D

12. In message passing, a blocking send means:
   a. The sender continues immediately without waiting
   b. The sender waits until the message is received
   c. The receiver blocks until the sender is ready
   d. Both sender and receiver block indefinitely

Answer : B

13. Which of the following is a required condition for deadlock to occur?
   a. Preemption
   b. No waiting
   c. Circular wait
   d. Infinite CPU speed

Answer : C

14. The Banker's algorithm is used for
   a. Deadlock detection
   b. Deadlock prevention
   c. Deadlock avoidance
   d. Recover from deadlock

Answer : C

15. In a modern OS, how does the concept of a "device queue" improve I/O management?
   a. By organizing pending I/O requests for a device in an optimized sequence
   b. By enabling simultaneous access to multiple devices
   c. By allowing the OS to prioritize user-level processes
   d. By allocating disk blocks in optimized way

Answer : A

16. With a single buffer, the time required to move data from system buffer to user memory is
   a. T + C
   b. max [C, T] + M
   c. max [C, T]
   d. T only

Answer : B

17. Which of the following disk scheduling algorithm provides "Service guarantee"?
   a. SSTF
   b. SCAN
   c. C-SCAN

d. N-step-SCAN

Answer : D

18. Allocation frequency for the Indexed allocation (file allocation method) with Fixed blocks is
    a. Low
    b. Low to High
    c. High
    d. No prediction

Answer : C

19. Which RAID level provides fault tolerance using block-level striping with distributed parity?
    a. RAID 1
    b. RAID 3
    c. RAID 4
    d. RAID 5

Answer : D

20. Which of the following layer considers device as a logical resource and not concern with details of actually controlling the device?
    a. Hardware
    b. Scheduling and Control
    c. Device I/O
    d. Logical I/O

Answer : D

Q. 2 State whether true or false. 25% negative for each wrong answer. **[20 questions, 10 Marks]**

1. Simple paging needs all the pages of a process in main memory.
   True
2. Performance of LRU for page replacement is close to Optimal and it is very easy to implement.
   False
3. Multilevel feedback scheduling eliminates the starvation completely by doubling time quantum for every pre-emption.
   False
4. Global page replacement causes the size of the resident set of processes to vary.
   True
5. When a new process is created, it is moved to from New state to either Ready or Ready/Suspend state.
   True
6. Processes will not be terminated if it executes invalid instruction but terminated if it tries to execute privileged instruction.
   False
7. If too many processes are resident, then on average, the size of the resident set of each process will be inadequate and frequent faulting will occur.
   True
8. Mutual exclusion using interrupt disabling works well with both uniprocessor and multiprocessor architecture.
   False
9. One of the drawbacks of the mutual exclusion using special machine instructions is possibility of both deadlock and starvation.
   True
10. Binary semaphore may only take on the values 0 and 1.
    True
11. Mutual exclusion is responsibility of programmer in both semaphore and monitors.
    False
12. Dekker's algorithm for solving mutual exclusion problem is complex and difficult to prove than Peterson's algorithm.
    True
13. A deadlock-free system is always starvation-free.

False

14. If two processes never access the same shared variable, they can still experience a race condition.
    False
15. Reader–writer locks cannot cause starvation if implemented with writer priority.
    False
16. I/O module with specialized instruction set for I/O is known as I/O channel.
    True
17. C-SCAN policy solves the problem of favouring latest arriving jobs in SCAN policy.
    False
18. RAID 6 rebuilds are slower than RAID 5 rebuilds
    True
19. There is no accommodation of the principle of locality in chaining file allocation method.
    True
20. In indexed file allocation, fixed-size blocks eliminate external fragmentation whereas variable-size portions improve locality.
    True