

Registration No: _____

Paper Code: A

Course Code: CSE316
Course Title: OPERATING SYSTEMS

Max. Marks: 70

Time Allowed: 3 hrs

Read the following instructions carefully before attempting the question paper.

1. Match the Paper Code shaded on the OMR Sheet with the Paper code mentioned on the question paper and ensure that both are the same.
2. This question paper is divided into two parts A and B.
3. Part A contains 30 questions of 1 mark each. 0.25 marks will be deducted for each wrong answer.
4. Part B contains 5 questions of 10 marks each. Attempt any 4 questions out of these 5 questions. In case all the 5 questions are attempted then only the first four attempted question will be evaluated.
5. Attempt all the questions in serial order.
6. Do not write or mark anything on the question paper except your registration no. on the designated space.
7. After completion of first 90 minutes, the OMR sheet will be taken by the invigilator.
8. Submit the question paper and the rough sheet(s) along with the answer sheet to the invigilator before leaving the examination hall.

Part- A

- Q1. 1) A computer system has 6 tape drives, with 'n' processes competing for them. Each process may need 3 tape drives. The maximum value of 'n' for which the system is guaranteed to be deadlock free is?
A) 2 B) 3 C) 4 D) 1 L3CO4
2. 'm' processes share 'n' resources of the same type. The maximum need of each process doesn't exceed 'n' and the sum of all their maximum needs is always less than $m+n$. In this setup, deadlock _____
A) can never occur B) may occur C) has to occur D) none of the mentioned L3CO4
3. The Banker's algorithm is _____ than the resource allocation graph algorithm.
A) less efficient B) more efficient C) equal D) none of the mentioned L3CO4
4. The content of the matrix Need is _____
A) Allocation - Available B) Max - Available C) Max - Allocation D) Allocation - Max L3CO4
5. What are the three copyrights?
A) copy B) transfer C) limited copy D) all of the mentioned L3CO4
6. What is 'separation' in security of Operating systems?
A) To have separate login for different users
B) To have separate Hard disk drive/partition for different users
C) It means keeping one user's objects separate from other users
D) None of the mentioned L3CO4
7. Cost factors for process termination include _____
A) Number of resources the deadlock process is not holding
B) CPU utilization at the time of deadlock
C) Amount of time a deadlocked process has thus far consumed during its execution
D) All of the mentioned L3CO4
8. What is true regarding 'Fence'?
A) Its a method to confine users to one side of a boundary
B) It can protect Operating system from one user
C) It cannot protect users from each other
D) All of the mentioned L3CO4
9. If the set of resources available to the process is fixed throughout the process's lifetime then its domain is _____
A) static B) dynamic
C) neither static nor dynamic D) none of the mentioned L3CO4

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25. _____ controller sends the command placed into it, via messages to the _____ controller.
A) host, host B) disk, disk C) host, disk D) disk, host L6CO6

26. The time taken for the desired sector to rotate to the disk head is called _____.
A) positioning time B) random access time L6CO6
C) seek time D) rotational latency

27. The data structure for a sector typically contains _____.
A) header B) data area C) trailer D) all of the mentioned L6CO6

28. The link between two processes P and Q to send and receive messages is called _____.
A) communication link B) message-passing link L6CO6
C) synchronization link D) all of the mentioned

29. The Zero Capacity queue _____.
A) is referred to as a message system with buffering
B) is referred to as a message system with no buffering
C) is referred to as a link
D) none of the mentioned L6CO6

30. Bounded capacity and Unbounded capacity queues are referred to as _____.
A) Programmed buffering B) Automatic buffering
C) User defined buffering D) No buffering L6CO6

Part-B

Q.2 What is the purpose of interrupts? What are the difference between a trap and an interrupt? Can traps be generated intentionally by the user program? If so, for what purpose?

L2CO1[10 Marks]

Q.3 Consider a variant of the RR scheduling algorithm in which the entries in the ready queue are pointers to the PCBs.

- What would be the effect of putting two pointers to the same process in the ready queue?
- What would be two major advantages and two disadvantages of this scheme?
- How would you modify the basic RR algorithm to achieve the same effect without the duplicate pointers?

L4CO3 L2CO1[10 Marks]

Q.4 Consider a system with three smoker

processes and one agent process. Each smoker continuously rolls a cigarette and then smokes it. But to roll and smoke a cigarette, the smoker needs three ingredients: tobacco, paper, and matches. One of the smoker processes has paper, another has tobacco, and the third has matches. The agent has an infinite supply of all three materials. The agent places two of the ingredients on the table. The smoker who has the remaining ingredient then makes and smokes a cigarette, signaling the agent on completion. The agent then puts out another two of the three ingredients, and the cycle repeats. Write a program to synchronize the agent and the smokers using Java synchronization.

L3CO5 L2CO1[10 Marks]

Q.5 Compare the circular-wait scheme with the various deadlock-avoidance schemes (such as the banker's algorithm) with respect to the following issues:

- Runtime overheads
- System throughput

L3CO4 L2CO1[10 Marks]

Q.6 Consider the following page reference string:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, and seven frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.

- LRU replacement
- FIFO replacement

L4CO3 L2CO1[10 Marks]

--- End of Question Paper ---

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10. Global table implementation of the matrix table contains _____
A) domain B) object C) right-set D) all of the mentioned L3CO4
11. Program always deals with _____
A) logical address B) absolute address C) physical address D) relative address L4CO3
12. Operating System maintains the page table for _____
A) each process B) each thread C) each instruction D) each address L4CO3
13. Another solution to the problem of external fragmentation problem is to _____.
A) permit the logical address space of a process to be noncontiguous
B) permit smaller processes to be allocated memory at last
C) permit larger processes to be allocated memory at last L4CO3
D) all of the mentioned
14. External fragmentation will not occur when?
A) first fit is used B) best fit is used L4CO3
C) worst fit is used D) no matter which algorithm is used, it will always occur
15. Sometimes the overhead of keeping track of a hole might be _____.
A) larger than the memory B) larger than the hole itself L4CO3
C) very small D) all of the mentioned
16. Illegal addresses are trapped using the _____ bit.
A) error B) protection C) valid – invalid D) access L4CO3
17. In a paged memory, the page hit ratio is 0.35. The required to access a page in secondary memory is equal to 100 ns. The time required to access a page in primary memory is 10 ns. The average time required to access a page is?
A) 3.0 ns B) 68.0 ns C) 68.5 ns D) 78.5 ns L4CO3
18. The segment limit contains the _____.
A) starting logical address of the process B) starting physical address of the segment in memory
C) segment length D) none of the mentioned L4CO3
19. When the entries in the segment tables of two different processes point to the same physical location _____.
A) the segments are invalid B) the processes get blocked
C) segments are shared D) all of the mentioned L4CO3
20. Consider a computer with 8 Mbytes of main memory and a 128K cache. The cache block size is 4 K. It uses a direct mapping scheme for cache management. How many different main memory blocks can map onto a given physical cache block?
A) 2048 B) 256 C) 64 D) 8 L4CO3
21. Which of the following file attribute Access-control information determines who can do reading, writing, executing, and so on?
A) Protection B) Identifier
C) Type D) Time, date, and user identification L6CO6
22. Which table contains the information about each mounted volume?
A) mount table B) system-wide open-file table
C) per-process open-file table D) All of the mentioned L6CO6
23. The FAT is used much as a _____.
A) stack B) linked list C) data D) pointer L6CO6
24. When a file system is mounted over a directory that is not empty then _____.
A) the system may not allow the mount
B) the system must allow the mount
C) the system may allow the mount and the directory's existing files will then be made obscure
D) all of the mentioned L6CO6