

BCA/D-21

1237

OPERATING SYSTEMS

Paper-BCA-CTIS-107

Time : Three Hours]

[Maximum Marks : 60

Note : Question No. 1 is compulsory. In addition, attempt *four* more questions selecting exactly *one* question from each unit.

Compulsory Question

1. (a) List the major characteristics of operating system.
- (b) Differentiate between preemptive scheduling and non-preemptive scheduling.
- (c) What are the benefits of processes being co-operative?
- (d) State the various methods for handling a deadlock.
- (e) Differentiate between logical address space and physical address space.
- (f) State the various file access methods. (6×2=12)

UNIT-I

2. Discuss following in detail :
 - (i) Batch Systems.
 - (ii) Multiprogrammed Systems.
 - (iii) Multiprocessor Systems.
 - (iv) Real-Time Systems. (12)

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3. What do you mean by system call and system program? Explain various types of system calls and system programs in detail using suitable examples. (12)

UNIT-II

4. Discuss various algorithms for CPU-Scheduling. Explain with suitable examples. Also describe various methods for evaluating the algorithms. (12)
5. (a) What is a process? Describe process control block in detail. (6)
- (b) What are the various issues in multithreading? Explain in detail. (6)

UNIT-III

6. What is a semaphore? How semaphores can be implemented? Discuss various types of semaphores along with their usage. (12)
7. (a) Write short notes on deadlock prevention and detection. (6)
- (b) What is segmentation? Discuss segmentation hardware with the help of diagram. What type of fragmentation can be caused by segmentation? (6)

UNIT-IV

8. (a) 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 three, four or five frames?

Remember that all frames are initially empty, so your first unique pages will cost one fault each.

- (i) LRU replacement.
 - (ii) FIFO replacement.
 - (iii) Optimal replacement. (6)
- (b) Consider a system that supports the strategies of contiguous, linked, and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file? (6)
9. (a) Explain various attributes and operations of a file. Also discuss the protection mechanism in a file system. (6)
- (b) Suppose a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143. and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinder) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
(i) FCFS (ii) SSTF (iii) SCAN (iv) LOOK (v) C-SCAN
(vi) C-LOOK.
State three advantages and disadvantages of placing functionality in a device controller, rather than in the kernel. (6)

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