### MCA/DX
### OPERATING SYSTEMS
### Paper : MCA-304
### (Regular)

Time : Three Hours]                    [Maximum Marks : 80

**Note :** Attempt *five* questions in all. Question No. 1 is compulsory. Attempt remaining *four* questions selecting *one* question from each unit.

### (Compulsory Question)

1.  (a)  Explain briefly the role of Operating system as 'Resource Manager'.                                  3

    (b)  What is PCB? Why is it needed ?                    3

    (c)  What is a message-passing mechanism in inter-process communication ?                                3

    (d)  What are *four* necessary conditions for Deadlock ?   3

    (e)  What is Thrashing ? When does it occur? How can one avoid it ?                                        3

    (f)  Distinguish between User and Dynamically allocated file space.                                       3

    (g)  What are the goals of protection ?                 3

    (h)  Discuss the concept of polling in I/O devices.     3

### UNIT–I

2.  (a)  Describe the need of an Operating system. What are the functional sections of WINDOWS-Operating system?                                                7

(b) Compare and contrast Multiprogramming, Multitasking and Multithreading. What are the key motivations for the development of each? 7

3. Given :

| Process | Arrival Time | Processing Time |
|---------|-------------|-----------------|
| A | 0.0.0 | 3 |
| B | 1.001 | 6 |
| C | 4.001 | 4 |
| D | 6.002 | 2 |

(a) Draw a chart illustrating their execution, and

(b) Find the Average Waiting Time (rounding to the nearest tenth), using

(i) FCFS,

(ii) SJF,

(iii) SRT, and

(iv) RR (Time Quantum = 2)

scheduling algorithms. 14

## UNIT–II

4. (a) Explain any *two* classical problems of synchronization. Discuss solution of *one* of them. 8

(b) What is Critical section problem? How can it be solved? Explain any *one* method for solving this. 6

5. Explain the difference between Deadlock and Starvation by choosing appropriate examples. Suggest suitable actions to resolve the following :

(i) Deadlock prevention,

(ii) Deadlock avoidance, and

(iii) Deadlock detection. 14

## UNIT–III

6. (a) Discuss the following file allocation methods with their merits and demerits:

(i) Contiguous allocation.

(ii) Linked allocation.

(iii) Indexed allocation. 3×3=9

(b) Explain the difference between Tree Structured Directory and Acyclic Graph Directory. 5

7. (a) Compare and contrast each of the following terms with the help of suitable examples diagrammatically :

(i) Compaction,

(ii) Paging, and

(iii) Segmentation. 9

(b) Describe Belady's anomaly, and provide an example that illustrates the anomalous behaviour of FIFO. 5

## UNIT–IV

8. (a) On a disk with 1000 cylinders, numbers 0 to 999, compute the number of tracks the disk arm must move to satisfy all the requests in a disk queue. Assume the last request serviced was at track 348 and the head is moving towards zero. The queue in FIFO order contains requests for the following tracks : 126, 877, 695, 478, 108, and 379. Perform the computations for the following scheduling algorithms :

(i) SSTF.

(ii) C-SCAN.

(iii) C-LOOK. 3×3=9

(b) What do you understand by Domains of protection? Explain with examples from UNIX and MULTICS. 5

**9.** Write short notes on any *three* of the following :

   (a) Dynamic Protection Structures.

   (b) Use of DDE and OLE in WINDOWS.

   (c) Booting process in UNIX.

   (d) UNIX INODE Pointer System.

   (e) Comparison of WINDOWS and LINUX.                     14

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