Roll No. .....

MCA/D09

Operating Systems

Paper: MCA-304

5478

Time: Three Hours] [Maximum Marks: 80

Note:- Question No.**1** is compulsory. In addition to this attempt **FOUR** questions by selecting **ONE** question from each unit.

1. (a) What are system calls? Outline their significance. 3
   (b) What is a page fault? What causes page fault? 3
   (c) What is memory protection? What are its goals? 3
   (d) What is fragmentation? Can we eliminate it ? Justify your answer. 3
   (e) What is a critical section? 3
   (f) In what respects LINUX differs from UNIX ? 3
   (g) What is the process state diagram ? 3
   (h) What is device independence? How is it achieved? 3

UNIT-I

2.(a) What do you understand by an operating system? What are the major functions of an operating system . Explain. 7

(b) What is a scheduler? What should be the performance criteria for a scheduler? Compare and contrast important scheduling techniques. 7

3. Explain the following:
   (a) Distributed Systems
   (b) Real-time Systems. 14

UNIT-II

4(a) What is a 'Semaphore' ? What are the disadvantages of semaphore? Implement the Producer-Consumer problem using Semaphores. 9

(b) How deadlocks are detected and recovered? Explain. 5

5(a) What is deadlock avoidance? How is it different from deadlock prevention? Illustrate through suitable algorithms. 7

(b) What is mutual exclusion? What are the necessary and sufficient conditions for deadlock? 7

UNIT-III

6(a) What are file systems? What are their major functions? Discuss. 7

(b) What is the directory system? What are different ways to organize files in a directory system? Illustrate. 7

7(a) What is thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? 7

(b) What are paged memory systems? How are these implemented ? How are these different from segmented memory systems? Illustrate. 7

UNIT-IV

8. What is device scheduling? What are various scheduling policies? Illustrate significance of each. 14

9. Compare Windows and UNIX operating system with respect to resource usage. 14