

1079
B.E. (Computer Science and Engineering)
Fifth Semester
CSE-511: Operating System

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Write short notes on:-

- Why kernel based design is preferred?
- What are critical sections?
- Can we implement counting semaphores using multiple binary semaphores?
- Can we have larger logical address space than physical address space?
- List different types of CPU scheduling algorithms.
- What are main limitations of contiguous memory allocation?
- What is thrashing?
- What are boot blocks?
- What is the need of swap space?
- List any two LINUX based OS. (10x1)

UNIT - I

- Describe the purpose of an operating system. Differentiate between batch systems, multi-programmed, multitasking and multi-processing systems.
 - Explain the process state transition diagram. What is the main information contained in the process control block? (5,5)
- Assume the following set of processes, their burst time, arrival time and priority (1 is highest)

Processes	Burst Time	Arrival Time	Priority
P1	75	0	2
P2	40	10	3
P3	25	10	1
P4	20	80	4

Compare the average waiting time and turnaround time for process scheduling using round robin approach (quantum=15), FCFS, SJF and priority scheduling using Gantt charts.

P.T.O.

(2)

b) Can we say that monitors, conditional critical regions and semaphores are all equivalent? Demonstrate this by solving the problem related to Dining Philosopher for each case.

IV. a) In a paging and segmentation based system, references to swapped in locations accessible through an entry in an associative table takes 200ns. If the main memory page table must be used, the reference takes 400ns. References that result in page fault require 10ms if page to be replaced has been modified, 5ms otherwise. If the page fault rate is 5%, the associative table hit rate is 65% and 40% of replaced pages are dirty, what is the effective access time. Assume that system is running only a single process and CPU is idle during page swaps.

b) What is Demand Paging? How the performance of demand paging is measured?

c) What is LRU page replacement?

(5,3,2)

UNIT – II

V. a) Explain the structure of file control block? Describe the indexed disk space allocation method.

b) What are the virtual file systems? Explain the file structure and various free space management techniques. (5,5)

VI. a) Explain the different disk management techniques such as formatting, boot block and bad block management.

b) What are the different conditions for deadlock to occur? How Deadlock avoidance is different from prevention and detection. Explain the Banker's algorithm with the help of an example. (4,6)

VII. a) Show that it is possible for processes to complete their execution without entering a deadlock even if system is in unsafe state.

b) Describe the Memory management in LINUX? Describe the use of logical address space. (4,6)