Reg No.										

MANIPAL INSTITUTE OF TECHNOLOGY
(Constituent Institute of MAHE- Deemed University)
MANIPAL-576104

FIFTH SEMESTER B. E.(CSE) END SEMESTER EXAMINATION - DEC – 2006

OPERATING SYSTEMS AND UNIX

(CSE –307)

(10 POINT CREDIT SYSTEM)

TIME DURATION : 3 HOUR MAX.MARKS : 50

Instructions to Candidates

- Answer **ANY FIVE** full questions.

1A. Explain the layered structure of operating system. What are the advantages and disadvantages of layered approach? **3 Marks**

1B. Explain the dual mode of operation of operating systems. **3 Marks**

1C. Illustrate with Producer-Consumer problem, the direct communication among the processes using defined primitives. **4 Marks**

2A. For the following scenario, draw Gantt charts for preemptive priority and pre-emptive SJF. Calculate waiting time and turnaround time for each process and also average waiting time and average turnaround time. Lower the priority value, higher is the process priority. **5 Marks**

Process	Burst Time in ms	Arrival time in ms	Process priority
P0	10	0	5
P1	6	1	4
P2	2	3	2
P3	4	5	0

2B. Show that if the WAIT and SIGNAL operations are not executed atomically then mutual exclusion may be violated. **2 Marks**

2C. How do you use *mutex* semaphore to deal with n-processes critical section problem? Give your clear explanation. **3 marks**

3A. Consider a system with P_0 through P_4 and three resource types A, B, C. Assume resource type A has 10 instances, resource type B has 5 instances and resource type C has 7 instances. Following is the Maximum and Allocation matrices to the processes: **5 Marks**

	Allocation			Max		
	A	B	C	A	B	C
P0	0	1	0	7	5	3
P1	2	0	0	3	2	2
P2	3	0	2	9	0	2
P3	2	1	1	2	2	2
P4	0	0	2	4	3	3

i) Check whether the system remains in safe state or not at time t=t0. Give the safe sequence.

ii) At time t1>t0, Process P1 makes an additional instance of resources (1 0 2). Check whether this request could be granted and safety of the system. Select the processes in a cyclic order by assigning the values for i= 0, 1, 2, 3, 4, 0, 1, 2…. to find your answers for above questions.

3B. The following measurements are obtained from a system that uses a linear segmented memory with TLB. **2 Marks**

- Number of entries in TLB=16
- Time taken to conduct an associative search in TLB=160ns
- Main memory access time=1μs

Determine the average access time assuming a TLB hit ratio of 0.75

3C. Write a note on multiple partition allocation. **3 Marks**

4A. What is prepaging? How do you select a page size? **3 Marks**

4B. Describe Frame Allocation algorithm for n processes. **3 Marks**

4C. What is Access Control List? What is the protection mechanism provided for controlled access of file in multi user system. **4 Marks**

5A. Suppose that a disk drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and previous request was at cylinder 125. The queue of pending requests in FIFO order is **3 Marks**

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130.

Starting from current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms:

i) SSTF ii) SCAN iii) C-LOOK

5B. Explain the various ways by which the access matrix can be implemented effectively. **3 Marks**

5C. Discuss the following threading issues to be considered in multithreaded programs:

i) Signal handling
ii) Thread pools
iii) Pthreads **(1+1+2=4 Marks)**

6A. What are the common methods of System threats. **4 Marks**

6B. Discuss the process scheduling algorithms in Linux system. What is the need of slab allocation algorithm in this operating system. **6 Marks**