Reg No.										

MANIPAL INSTITUTE OF TECHNOLOGY
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MANIPAL-576104

V SEMESTER B.E. (CSE 307)
SUBJECT**: OPERATING SYSTEM AND UNIX**
Date: **09-01-2008**

TIME : 3 HOUR MAX.MARKS :50

Instructions to Candidates

- Answer **ANY 5** of the following.
- Write the question number clearly.

1a) Give two reason why caches are useful. What problems do they solve? What problems do they cause? 2 marks

1b) What are the differences between short-term, medium term, and long term scheduling 3 marks

1c)Explain briefly five services provided by the operating system that are designed to make it more convenient for users to use the computer system. In what cases it would be impossible for user-level programs to provide these services ? Explain 5 marks

2a) A system running ten I/O bound tasks and one CPU bound task. Assume that the I/O bound tasks issue an I/O operation once for every milliseconds of CPU computing and that each I/O operations takes 10 milliseconds to compute. Assume that the context-switching overhead is 0.1 milliseconds and all processes are long-running tasks. What is the CPU utilization for a round-robin scheduler when the time quantum is
i)10 milliseconds
ii) 1 millisecond 2 marks

2b)What the four necessary conditions for deadlock ? Explain how deadlock can be prevented 4 marks

2c) For the following

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P1	0 0 1 2	0 0 1 2	1 5 2 0
P2	1 0 0 0	1 7 5 0	
P3	1 3 5 4	2 3 5 6	
P4	0 6 3 2	0 6 5 2	
P5	0 0 1 4	0 6 5 6	

Write the content of the matrix Need?
Is the system safe?
If the request from a process P2 arrives for (0,4,2,0) can the request be granted immediately. If possible what will be the sequence of process execution 4 marks

3a)Explain the difference between internal and external fragmentation 2 marks

3b)Explain hashed page tables. Is the table size larger or smaller than inverted page table 4 marks

3c) Consider a paging system with the page table stored in memory

a) If a memory reference takes 200 nanoseconds, how long does a paged memory reference take
b) If we add associative registers, 75% of all page table references are found in the associative registers what is the effective memory reference time 2 marks

3d)Write two differences between user-level and kernel-level threads? Under what circumstance is one type better than the other 2 marks

4a) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? 3 marks

4b) 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 LRU replacement algorithms, assuming there are 3 page frames 4 marks

4c) Suppose that a disk drive has 5000 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 cylinders) that the disk arm moves to satisfy all the pending requests, for SSTF disk-scheduling algorithms? 3 marks

5a) Why are monitors used? Show how you obtain deadlock free solution to the dining-philosopher's problem using monitors 4 marks

5b) Show that if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated 2 marks

5c) Write note on the stack and buffer overflow way of attacking a network 4 marks

6a) Compare the various techniques for implementing the access matrix 3 marks

6b) Explain acyclic graph directories 3 marks

6c) How is physical memory managed in the case of Linux systems 4 marks