BE CST 6th Semester Examination, May 2006 Computer Science & Technology Dept. Operating System Principles (CST - 602)

F.M.: 100

TIME : 3 hrs

- Attempt any 3 questions from the first half, Question No. 6 from the second half and any two from the rest of the second half.
- Two marks in each half are reserved for clarity of presentation.
- Use separate answer book for each half.
- Answers should be in your own words as far as practicable.
- Make your own assumptions as and when necessary and state them at proper places.

First Half

1.	(a) What do you understand by i) waiting time ii) response time?	2+2
	(b) Describe the basic principle of Lottery Scheduling. \square	б
	(c) Discuss the significance of i) Ticket Transfer ii) Compensation Tickets	3+3
2.	(a) State the Bakery algorithm.	4
	(b) Show that all the three requirements for a solution to critical section preserved in the above algorithm.	broblem is 6
	(c) Propose a starvation free solution to Readers-Writers problem using semaphores.	
		6
3.	(a) Describe the 50-percent rule.	2
	(b) Write short notes on i) PTLR ii) TLB	3+3
	(c) Describe the working principle of Inverted Page Table combined with Anchor Table (HAT).	the Hash 5
	(d) Why is HAT used with Inverted Page Tabled	3
4.	(a) Describe the benefits of demand paging.	3
	(b) Write short notes on i) pure demand paging ii) prepaging	2+2
	(c) Describe the role of the following bits in demand paging:i) reference bit ii) modify bit iii) valid-invalid bit	2+2+2
	(d) Discuss how a process creation using forkQ system call can be optimized paging environment.	in demand 3
5.	 (a) Given that: i) TLB hit ratio: 0.88 ii) TLB access time: 20 ns iii) Mem time: 110 ns iv) Two level paging architecture v) Page fault service ti vi) Page-fault rate: 0.0000001 (1 in a million) 	ory access me: 25 ms
	i. Find out the effective memory access time in the above demand paronment.	aging envi

6

ii. Compare this time with the effective memory access time of normal paging (without demand paging) environment.

(b) What is thrashing?

4

(c) How can you prevent thrashing in a system? 4

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Second Half

- 6. Write short notes on the following.
 - (a) The uniform interface provided by the Device Drivers to the rest of the Kernel.
 - (b) Filesystem Integrity and its checking.
 - (c) Block size and fragmentation in a filesystem.
 - (d) Domain of Protection

[4x4]

- 7. (a) Consider the command "cp *filel file2'* under unix operating system to copy a file *filel* to another file *file2*, Explain how different modules of the kernel is involved to execute this command.
 - (b) Mention the objectives to be fulfilled while designing the organization of files and directories in a filesystem.
 - (c) Explain with example(s) what you mean by data and metadata in the context of **file system.** How are they managed?
 - (d) Explain with example(s) what you mean by trap-door, Trojan Horse, worm and virus in the context of security.

[6+3+3+4]

- 8. (a) Explain why *files* and *open files* are treated separately within the kernel.
 - (b) Explain how device files in Unix enable us to use the same file-interface over in put/output devices.
 - (c) Describe different strategies to maintain protection information in the operating system along with their merits and demerits.

[4+6+6]

- 9. (a) Present a comparative study between deadlock prevention and avoidance.
 - (b) "Presence of a cycle in the resource allocation graph in a system with multiple instances of resources does not necessarily indicate a deadlock." Explain with example(s).
 - (c) Explain the different approaches for deadlock recovery along with their merits and demerits.

[6+5+5]