

**C 3145**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Fifth Semester

Information Technology

CS 1252 — OPERATING SYSTEMS

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Describe the differences between symmetric and asymmetric multiprocessing.
2. Describe the difference between preemptive and non preemptive scheduling.
3. What is the purpose of system calls?
4. What is the purpose of the command interpreter? Why is it usually separate from the kernel?
5. Discuss the relative advantages and disadvantages of sector sparing and sector slipping.
6. What are two differences between user-level threads and kernel-level threads?
7. Describe the difference between first-fit, best-fit and worst-fit dynamic storage allocation strategies.
8. What is the main advantage of the layered approach to system design?
9. What is Virtual memory?
10. What are the five major activities of an operating system in regard to memory management?

PART B — (5 × 16 = 80 marks)

11. (a) (i) List five services provided by an operating system. Explain how each provides convenience to the users. (6)
- (ii) Describe the difference among the short term, medium term, and long term schedulers. (10)

Or

- (b) Discuss briefly the various issues involved in implementing Inter process communication (IPC) in message passing system. (16)

12. (a) Discuss the critical section problem. Solving the Readers-Writers problem using semaphores. (16)

Or

- (b) Assume the following processes arrive for execution at the time indicated and also mention with the length of the CPU-burst time given in milliseconds.

Job	Burst time (ms)	Priority	Arrival time (ms)
A	10	5	0
B	6	2	0
C	7	4	1
D	4	1	1
E	5	3	2

- (i) Give a Gantt chart illustrating the execution of these processes using FCFS, Round Robin (quantum = 5), and Priority (Preemptive and Non Preemptive). (4)
- (ii) Calculate the average waiting time and average turn around time for each of the above scheduling algorithm. (12)

13. (a) Consider the following snapshot of a system. Execute Banker's algorithm answer the following.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P <sub>0</sub>	0	0	1	0	0	1	1	5	2
P <sub>1</sub>	1	0	0	1	7	5			
P <sub>2</sub>	1	3	5	2	3	5			
P <sub>3</sub>	0	6	3	1	6	5			
P <sub>4</sub>	0	0	1	5	6	5			

- (i) What is the content of need matrix? (2)
- (ii) Is the system in a safe state? If the system is safe, show how all the process could complete them execution successfully. If the system is unsafe, show how deadlock might occur. Explain. (6)
- (iii) If a request from process P<sub>1</sub> arrives (0,4,2) can the request be granted? If granted, write the sequence of processes. (8)

Or

(b) (i) What is a translation look-aside buffer? Why is it needed? (12)

(ii) Consider the following segment table. (4)

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

(1) 0,430 (2) 1,10 (3) 2,500 (4) 3,400

14. (a) 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.

Calculate the number of page faults would occur for the following page replacement algorithm with frame size of 3 and 6.

(i) LRU (ii) FIFO (iii) Optimal. (16)

Or

(b) (i) Explain the various file Access methods. (6)

(ii) Discuss the layered architecture of file system. (10)

15. (a) A hard disk having 2000 cylinders, numbered from 0 to 1999. The drive is currently serving the request at cylinder 143, and the previous request was at cylinder 125. The status of the queue is as follows :

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

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) FCFS (iii) SCAN (iv) C-SCAN (16)

Or

(b) Explain the free space management using Bit Vector, Linked list, Grouping and Counting methods. (16)