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VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (I.T.) III Year I-Semester (Main) Examinations, Nov./Dec.-2016

Operating Systems

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. What is an Operating System? Mention the goals of Operating System.
2. What is the purpose of command interpreter? Why is it usually separate from the kernel?
3. Under what circumstances the preemptive schedulers may take scheduling decisions?
4. Define Semaphore. Mention its importance in Operating System.
5. Distinguish between internal fragmentation and external fragmentation.
6. What is Belady's anomaly? Which page replacement algorithm suffers from Belady's anomaly?
7. What is an i-node? Give the structure of Unix/Linux i-node.
8. Define latency, transfer and seek time with respect to disk I/O.
9. List the goals and principles of protection in a modern computer system.
10. List the methods used by an OS to authenticate its users.

Part-B (5 × 10 = 50 Marks)

11. a) What is a system call? Discuss about various types of system calls. [5]
- b) Distinguish between user level threads and kernel level threads. [5]
12. a) What is a CPU scheduler? Compare and contrast between long term, short term and medium term schedulers. [5]
- b) Consider that there are five processes (P₀, P₁, P₂, P₃, P₄) with four types of resources (A, B, C, D). A snapshot of that system is (according to Banker's algorithm):

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P ₀	0	0	1	2	0	0	1	2	1	5	2	0
P ₁	1	0	0	0	1	7	5	0				
P ₂	1	3	5	4	2	3	5	6				
P ₃	0	6	3	2	0	6	5	2				
P ₄	0	0	1	4	0	6	5	6				

- i) What is the content of the matrix Need? [1]
- ii) Check whether the system is in a safe state? [2]
- iii) If a request from process P₁ arrives for (0, 4, 2, 0), can the request be granted immediately? [2]
13. a) Compare paging with segmentation with respect to the amount of memory required by the address translation structures in order to convert virtual addresses to physical addresses. [6]
- b) What is a page fault? List the steps involved in handling a page fault. [4]

Contd...2

- 14. a) Consider a disk queue with I/O requests for the blocks on cylinders: **95, 181, 39, 123, 12, 124, 65, 68** and the disk head is initially at **57**. Compute the total number of head movement according to **SSTF** and **C-Look** disk scheduling algorithm. [6]
- b) What are the different principles that can be employed to improve the efficiency of I/O? [4]
- 15. a) What is an access matrix? Describe the methods of implementing access matrix. [6]
- b) List and discuss about the levels of security measures to be taken up to protect a system. [4]
- 16. a) Explain about Interprocess Communication techniques. [5]
- b) Describe the solution for Dining-Philosopher problem using monitors. [5]
- 17. Write short notes on any **two** of the following:
 - a) Page frame allocation policies [5]
 - b) RAID [5]
 - c) Denial of Service attacks. [5]
