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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Fourth Semester, B.E. - Information Science and Engineering

Semester End Examination; May / June - 2019

Operating System

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. What is Operating System? Explain Multiprogramming and Time sharing systems. 8
- b. Explain dual mode operating in OS with a neat block diagram. 8
- c. Distinguish between the following pairs of terms : 4
 - i) CPU burst jobs and I/O burst jobs
 - ii) User mode and Kernel mode operations
- 2 a. What is a Process? What are the states of a process can be in? Give the process state diagram clearly indicating the conditions for a process to shift from one state to another. 8
- b. What are the merits of interprocess communication? Name the two major models of interprocess communication. Explain any one. 8
- c. Differentiate between Process and Thread (any two). 4

UNIT - II

- 3 a. Is CPU scheduling necessary? Discuss the five different scheduling criteria used in comparing scheduling mechanism. 6
- b. Calculate average waiting time, average completion time, average turnaround time and average response time using round robin scheduling algorithm using time quantum = 2.

Process No.	Arrival Time	Burst time
1	0	4
2	1	5
3	2	2
4	3	1
5	4	6
6	6	3

- c. Explain the benefits of multi threaded programming. 4
- 4 a. What is a critical section problem? What requirements should a solution to critical problem satisfy? State Peterson's solution and indicate how it satisfies requirements? 10
- b. Explain the operation of semaphores. Bring out how their operation may lead to inversion? 10

UNIT - III

5 a. Consider the following snapshot of a system :

	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				

10

With respect to Banker’s algorithm identify,

- i) Need matrix ii) Is the system is a safe state with its sequence, if system is safe
- b. What is wait for graph? Explain how it is useful for detection of deadlock? 6
- c. Explain how deadlocks are recovered once the deadlock has been detected? 4
- 6 a. Distinguish between internal and external fragmentation. 6
- b. What is paging? Explain its operation, clearly indicating how the logical address is converted to physical address. 10
- c. Why is Translation Look aside Buffer (TLB) important? In a simple paging system what information is stored in TLB? 4

UNIT - IV

- 7 a. Consider the following page reference. Indicate page faults and calculate the total number of page faults for optimal and LRU. The total number of available frames is 4. The reference is 1, 2, 3, 2, 5, 6, 3, 4, 6, 3, 7, 3, 1, 5, 3, 6, 3, 4, 2, 4, 3, 4, 5, 1. 10
- b. What is Thrashing? How can it be controlled? 6
- c. Explain the concept of copy-on write. 4
- 8 a. What is a file? Explain different file access methods. 10
- b. What are directories? List different types of directory structures with examples. Mention their advantages and disadvantages. 10

UNIT - V

- 9 a. Explain how free space is managed? 6
- b. Describe the methods used for implementing the directories. 10
- c. List and explain the contents of typical file control block. 4
- 10 a. Let a disk drive has 500 cylinders from 0 to 4999 . Currently drive is at 143rd cylinder and the previous request was at cylinder 125. Queue of pending request in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithms from current position : 16
- i) FCFS ii) SCAN iii) LOOK iv) SSTF
- b. Explain the selection of disk scheduling algorithm. 4