ode: 20IT3501

III B.Tech - I Semester – Regular Examinations - DECEMBER 2022

OPERATING SYSTEMS
(INFORMATION TECHNOLOGY)

Duration: 3 hours   Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries
14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level   CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Describe the concept of system calls and categories of system calls. Explain how the fork () system call operates.	L2	CO1	7 M
	b)	Describe the many types of operating systems supported by single, multi, and clustered computer systems.	L2	CO1	7 M
OR					
2	a)	Discuss the term operating system. Mention the command interpreters and describe it.	L2	CO1	7 M
	b)	Explain the operating system services.	L2	CO1	7 M
UNIT-II					
3	a)	Consider a scenario where there are three CPU-intensive operations that take 20, 60, and 30 time units, respectively, and arrive at times 0, 2, and 6. If the operating system uses a shortest remaining time first scheduling technique, how many context changes are required? Do not count the context switches at time zero and at the end.	L3	CO3	7 M

	b)	With the use of a diagram, go over the process transition diagram and describe the various scheduler kinds. The following jobs, assuming they arrive for processing at the times mentioned, will each take the specified length of time to complete. Determine the typical turnaround time and typical waiting time for each job using FCFS and SJF techniques. Jobs(1,2,3), Arrival Time(1,5,6), Burst Time(8,2,4).	L3	CO3	7 M

		OR			
4	a)	Explain the process control block and its main functions. Also describe the components of it.	L2	CO1	4 M
	b)	Describe the difference between scheduling algorithms – FCFS Scheduling, Shortest-Job-First Scheduling, Priority Scheduling and Round-Robin Scheduling.	L3	CO3	10 M

UNIT-III

5	a)	Explain the prerequisites for a solution to the critical section problem and the critical section problem in action. Use this strategy to address the issue facing readers and writers problem.	L3	CO2	7 M
	b)	Elucidate binary semaphore. Implement wait and signal for binary semaphores without busy wait. Use binary semaphores to demonstrate how counting semaphores are implemented.	L3	CO2	7 M

		OR			

6	a)	Show the usage of Safety and Resource - Request Banker's algorithms for deadlock avoidance.	L3	CO3	7 M
	b)	Explain the mutual exclusion problem in relation to concurrent processes using an appropriate example. Describe the producer-consumer issue and provide a semaphore-based solution.	L3	CO2	7 M

UNIT-IV

7	a)	The page reference string 0, 1, 2, 3, 0, 1, 2, 3, 4,5, 6, 7 is an example. How many page faults would the following replacement methods experience under the assumption of demand paging with three frames? Employing LRU replacement, FIFO replacement, and optimal replacement.	L3	CO3	7 M
	b)	Differentiate paging with segmentation with respect to how much memory the address translation structures require to convert virtual addresses to physical addresses.	L4	CO4	7 M

OR

8	a)	Describe the fundamentals of FIFO page replacement and the benefits of using it.	L3	CO3	7 M
	b)	Differentiate optimal page replacement and LRU page replacement algorithms with an example.	L3	CO3	7 M

UNIT-V

9	a)	Describe different disk scheduling techniques in detail using an example. i) FCFS ii) SSTF iii) SCAN iv) LOOK.	L3	CO3	10 M
	b)	Explain the file-system structure.	L2	CO1	4 M

OR

10	a)	Determine the goal of file concept and its key components.	L2	CO1	4 M
	b)	Elaborate the file system implementation issues in OS. Also explain hash table and its disadvantages.	L2	CO1	10 M