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B022315(022)

B. Tech. (Third Semester) Examination, Nov.-Dec. 2021

AICTE   (New Scheme)

(CSE Branch)

OPERATING SYSTEMS

Time Allowed : Three hours

Maximum Marks : 100

Minimum PES Marks 35

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two from (b), (c) and (d) parts of each question. Part (a) carry 4 marks each and part (b), (c) and (d) carry 8 marks each.

Unit-I

1. (a) What do you mean by time sharing operating? Give an example.   4

(b) What are the functions of operating system? Explain in brief.   8

(c) Explain the working and architecture of an operating system in detail.   8

(d) Explain the various system calls in an operating system.   8

Unit-II

2. (a) Define process control block with proper diagram.   4

(b) Consider the above set of processes that arrive at time zero. Calculate the average waiting time, average turnaround time and throughtput with FCFS and SJF.   8

Process	Burst time
P_1	5
P_2	24
P_3	16
P_4	10
P_5	3

(c) What do you mean by Dining Philosopher method? Explain with suitable diagram.   8

(d) Explain Producer-Consumer problem in detail.   8

Unit-III

3. (a) Define resource allocation graph with suitable diagram.   4

(b) Explain the method used in deadlock prevention.   8

(c) What are the four necessary conditions required to hold a deadlock?   8

(d) An operating system uses the banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P0, P1 and P2. The table given below presents the current system state. Here, the allocation matrix shows the current number of resources of each type allocated to each process and the max matrix shows the maximum number of resources of each type required by each process during its execution.   8

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in safe state. Consider the following independent requests for additional resources in the current state :

REQ 1 : P0 requests 0 units of X, 0 units of Y and 2 units of Z

REQ 2 : P1 requests 2 units of X, 0 units of Y and 0 units of Z

Unit-IV

4. (a) Define resident monitor.   4

(b) Explain address translation from logical address to physical address.   8

(c) What is page replacement algorithm? Explain any one algorithm with example.   8

(d) What is thrashing? State the cause of thrashing.   8

Unit-V

5. (a) What is buffering?   4

(b) Explain virtual machine operating system.   8

(c) Explain file organization and access mechanism.   8

(d) Explain the various disk scheduling algorithm with suitable example.   8