CBCS SCHEME

USN | | | | | | | | | | |

18CS43

Fourth Semester B.E. Degree Examination, June/July 2024
Operating Systems

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain what is an operating systems. Discuss the role of operating system from different view points. **(06 Marks)**

b. Explain the dual mode of operation of an operating system. **(07 Marks)**

c. List and explain the different states of process with a neat diagram. **(07 Marks)**

OR

2 a. With a neat diagram, explain the concept of virtual machine. **(07 Marks)**

b. What are system calls? Explain the handling of open ( ) system call. **(07 Marks)**

c. List the different operating system services and explain. **(06 Marks)**

Module-2

3 a. Explain the different multi threading models with a diagram. List out the different threading issues with multi threaded models. Explain any one. **(10 Marks)**

b. Calculate the average waiting time by drawing Gantt chart using first come first serve, shortest job first and round robin scheduling algorithms for the following process. Time quantum = 4

Process	Burst time
P_0	24
P_1	3
P_2	3

(10 Marks)

OR

4 a. What is a critical section problem? List and explain the solution to this problem using Peterson's algorithm. **(10 Marks)**

b. What is Bounded Buffer problem? Explain how semaphores can be used for synchronization in this problem. **(10 Marks)**

Module-3

5 a. What is a deadlock? Explain how can it be prevented. **(10 Marks)**

b. Explain Banker's algorithm for deadlock avoidance. **(10 Marks)**

OR

6 a. Given a system with total resources A(3) ; B(14) and C(12), determine whether the following system is in safe state or not using Banker's algorithm.

	Allocation			Max			Availability		
	A	B	C	A	B	C	A	B	C
P_0	0	0	1	0	0	1	1	5	2
P_1	1	0	0	1	7	5			
P_2	1	3	5	2	3	5			
P_3	0	6	3	0	6	5			
P_4	0	0	1	0	6	5			

Justify can $P_1(0, 0, 1)$ request be granted immediately? **(10 Marks)**

b. Explain the concept of paging with a neat diagram. **(10 Marks)**

Module-4

7 a. What is demand paging? Explain the steps in handling a page fault with a neat diagram. **(10 Marks)**

b. Consider the following page reference stream,
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
How many page faults would occur for LRU and FIFO page replacement algorithms assuming 3 Frames? What is Belady's anomaly? **(10 Marks)**

OR

8 a. Explain the two structures used to implement file systems. **(10 Marks)**
b. List the different methods of disk allocation and explain any one. **(05 Marks)**
c. List the different free space management approaches and explain any two. **(05 Marks)**

Module-5

9 a. Explain access matrix and list its implementation. **(10 Marks)**
b. Explain various disk scheduling algorithms with an example. **(10 Marks)**

OR

10 a. Explain the various components of the Linux system. **(10 Marks)**
b. Explain disk formatting, boot block and bad block. **(10 Marks)**

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