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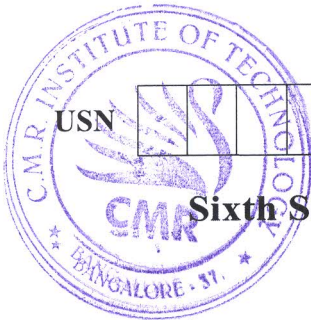### Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Operating Systems

Time: 3 hrs.   Max. Marks : 80

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

Module-1

1   a.   Explain the role of operating system from different viewpoints. Explain the dual mode of operation of an operating system. **(07 Marks)**
    b.   Demonstrate the concept of virtual machine with an example. **(05 Marks)**
    c.   Explain the types of multiprocessing system and the types of clustering. **(04 Marks)**

OR

2   a.   Describe the implementation of interprocess communication using shared memory and message passing. **(06 Marks)**
    b.   Demonstrate the operations of process creation and process termination in UNIX. **(06 Marks)**
    c.   Explain the different states of a process, with a neat diagram. **(04 Marks)**

Module-2

3   a.   Point out and explain the various benefits of multi threaded programming. **(04 Marks)**
    b.   Consider the five processes arrive at time 0, in the order given, with the length of the CPU burst given in milliseconds.

Process	Burst time
P_1	10
P_2	29
P_3	3
P_4	7
P_5	12

Consider the FCFS, SJF and RR (quantum = 10ms) scheduling, draw the Gantt chart for each of the scheduling. Determine average waiting time and turnaround time for all the 3 scheduling algorithm. Which algorithm would give the minimum average waiting time? **(12 Marks)**

OR

4   a.   What is the critical section problem point out and explain its three requirements. **(05 Marks)**
    b.   What are semaphores, explain how mutual exclusion is implemented with semaphores. **(05 Marks)**
    c.   What is Dimming philosopher problem explain its monitor solution. **(06 Marks)**

Module-3

5 a. Consider the following snapshot of a system :

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

Find the need matrix and calculate safe sequence using Banker's algorithm. Mention the above system is safe or not safe. **(08 Marks)**

b. What are the necessary conditions for deadlock? Explain different methods to recover from deadlock. **(08 Marks)**

OR

6 a. What is paging? Explain paging hardware with translation look-aside buffer. **(06 Marks)**

b. Explain the structure of page table with respect to hierarchical paging. **(06 Marks)**

c. Given the 5 memory partitions 100 KB, 500 KB, 200 KB, 300 KB and 600 KB, how each of the first fit, best fit and worst fit algorithms place processes of 212 KB, 417 KB, 112KB and 426KB size. Which algorithm makes efficient use of memory? **(04 Marks)**

Module-4

7 a. Illustrate how demand paging affects systems performance. **(08 Marks)**

b. Describe the steps in handling a page fault. **(08 Marks)**

OR

8 a. Explain the various types of directory structures. **(08 Marks)**

b. Describe various file allocation methods. **(08 Marks)**

Module-5

9 a. Explain various disk scheduling algorithm with an example. **(10 Marks)**

b. Explain access matrix protection system of O.S. **(06 Marks)**

OR

10 a. Explain the various. Components of the Linux system. **(08 Marks)**

b. Explain the process management in Linux. **(08 Marks)**

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