U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E.
Branch: Information Science and Engineering
Course Code: 22IS4PCOPS
Course: Operating System

Semester: IV
Duration: 3 hrs.
Max Marks: 100

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	***CO***	***PO***	**Marks**
1	a)	Explain the memory management in OS.	CO1	PO1	**10**
	b)	Elucidate Operating system services.	CO1	PO1	**10**
		UNIT - II			
2	a)	Describe PCB used in process management. Elucidate Short term, long term and medium term scheduler.	CO1	PO1	**10**
	b)	Explain following multithreading models. i. Many-to-One model ii. One-to-One model iii. Many-to-Many model	CO2	PO2	**10**
		OR			
3	a)	Summarize Inter Process Communication (IPC) using shared memory and message passing.	CO2	PO2	**10**
	b)	i) Interpret the significance of semaphore and its standard operations that modifies the semaphore value. ii) Provide the detailed code segments for the standard semaphore operations of buzy waiting and without buzy waiting. Also specify how semaphore handles the critical section problem using entry and exit sections.	CO2	PO2	**10**
		UNIT - III			
4	a)	Consider the following set of processes, with the length of CPU burst given in milliseconds.	CO2	PO2	**10**

Process	Arrival Time	Burst Time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

Draw Gantt chart that illustrate execution of these processes using SRTF scheduling algorithm. What is the waiting time of each process for SRTF scheduling?

Compute Average waiting time and Average turnaround time using FCFS CPU Scheduling for the following problem.

Process	Arrival Time
P_1	24
P_2	3
P_3	3

b) Explain deadlock prevention methods and deadlock avoidance methods. — CO1 | PO1 | **10**

OR

5 a) Consider the following snapshot of a system. — CO2 | PO2 | **10**

Process	Allocation	Max
	A B C D	**A B C D**
P_0	3 0 1 4	5 1 1 7
P_1	2 2 1 0	3 2 1 1
P_2	3 1 2 1	3 3 2 1
P_3	0 5 1 0	4 6 1 2
P_4	4 2 1 2	6 3 2 5

Answer the following questions using the banker's algorithm:

i. Illustrate that the system is in a safe state by demonstrating an order in which the processes my complete.

ii. If a request from process P_1 arrives for (1,1,0,0) can the request be granted immediately?

iii. If a request from process P_4 arrives for (0,0,2,2) can the request be granted immediately?

b) Elucidate the scheduling criteria of CPU scheduling algorithms. — CO2 | PO2 | **10**

UNIT - IV

6 a) Provide hardware support and protection mechanism under paging method of memory allocation. — CO1 | PO1 | **10**

b) Consider the following page reference string: — CO2 | PO2 | **10**

7,2,3,1,2,5,3,4,6,7,7,1,0,5,4,6,2,3,0,1

Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?

I. LRU replacement

II. FIFO replacement

III. Optimal replacement

			UNIT - V			
	7	a)	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for FCFS and SCAN disk-scheduling algorithms.	CO2	PO2	**10**
		b)	Suppose that a disk drive has 100 cylinders, numbered 0 to 99. The drive is currently serving a request at cylinder 63. The queue of pending requests, in FIFO order, is: 33, 72, 47, 8, 99, 74, 52, 75 (Hint: Inward direction is preferred, therefore moves towards left) Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for SSTF and LOOK disk-scheduling algorithms.	CO2	PO2	**10**

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