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II Semester M.C.A. Degree Examination, December - 2022

COMPUTER SCIENCE

Operating Systems

(CBCS Scheme Y2K20)

Paper: 2 MCA 1

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:*Answer ALL Parts.***PART - A**

Answer any FIVE questions.

(5×6=30)

1. What is Operating System? Explain multiprogramming and time sharing systems.
2. What are system calls? Briefly Point out its types.
3. Define semaphores. Explain Reader-Write problem with semaphore in detail.
4. Describe Mutual Exclusion implementation with TestAndSet().
5. What are monitors? Explain dining Philosopher's solution using monitor.
6. Describe both internal and external fragmentation problems encountered in a contiguous memory allocation scheme.
7. Explain swap in and swap out in two process using disk as a backing store.
8. Briefly describe the implementation of Access Matrix.

PART - B

Answer any FOUR questions.

(4×10=40)

9. Consider the following snapshot of a system:

Processes	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P0	1	1	2	4	3	3	2	1	0
P1	2	1	2	3	2	2			
P2	4	0	1	9	0	2			
P3	0	2	0	7	5	3			
P4	1	1	2	1	1	2			

- a) Calculate the content of the need matrix.
- b) Is the system in a safe state?
- c) Determine the total amount of resources of each type.

(10)

[P.T.O.]

10. a) 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 replacement algorithms assuming 3 frames? Which one of the above is most efficient? (6)
- b) Explain demand paging system. (4)

11. Consider the following set of processes:

Process	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9

Draw Gantt Chart and Compute average turnaround time and the average waiting time using FCFS, Pre-emptive SJF and RR (Quantum=4). (10)

12. a) Explain Dual Mode Operation with a neat diagram. (4)
- b) With a neat diagram explain Queueing diagram of Process Scheduling. (6)

13. a) List and Explain the goals and principles of security. (6)
- b) Write a short note on Virtual Machines. (4)

14. a) What is System Boot and Context Switch? (4)
- b) Discuss the features of Linux Operating System. (6)