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Reg. No. | | | | | | | | |

**II Semester M.C.A. Degree Examination December - 2024**

**COMPUTER SCIENCE**

**Operating Systems**

**(CBCS Scheme Y2k20)**

**Paper : 2MCA1**



**Time : 3 Hours** **Maximum Marks : 70**

***Instructions to Candidates* :**

1. **Answer any Five questions From Part - A.**
2. **Answer any Four sub questions from Part - B.**

## PART-A

**Answer any Five questions :** (5×6=30)

1. Define operating system. Explain the functions of operating system.
2. Explain dual mode operation with a neat diagram.
3. What are system calls? Briefly point out its types.
4. What is Deadlock? Explain the necessary conditions for deadlock to occur.
5. What is thrashing? How can it be controlled?
6. Describe both internal and external fragmentation problems encountered in a contiguous memory allocation scheme.
7. Draw the logical view of segmentation and explain.
8. Write the Need and Goals of protection in OS.

## PART - B

**Answer any Four questions :**

9. a) Explain all the information associated with a specific process in PCB. (4)

   b) What are Monitors? Explain Dining Philosopher's problem with solution using monitor. (6)

10. a) Define Process. Explain the states of process. (5)

    b) Define semaphores. Explain Reader-Writer problem with semaphore in detail. (5)

[P.T.O.

11. 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 Three Frames? Which one of the above is most efficient? (7)

b) What are Virtual machines? Explain the benefit of creating virtual Machines. (3)

12. a) Explain various techniques of Disk Management in mass storage structure. (3)

b) Define Paging. Explain the Address Translation in paging. (7)

13. 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? (4)

b) Is the system in a safe state? (3)

c) Determine the total amount of resources of each type? (3)

14. a) Consider the processes P1, P2, P3, P4 given in the below table, arrives for execution in the same Order, with arrival time 0 and given burst time. Find the Average waiting time and Turnaround Time using FCFS scheduling algorithm. (5)

| Process | Burst Time |
|---|---|
| P1 | 21 |
| P2 | 3 |
| P3 | 6 |
| P4 | 2 |

b) Write a short notes on : Context Switch and Access Matrix. (5)