

**II Semester M.C.A. Examination, July 2017  
(CBCS Scheme)  
COMPUTER SCIENCE  
MCA 204T : Operating Systems**

Time : 3 Hours

Max. Marks : 70

*Instructions :* 1) Part – A : Answer any five questions.  
2) Part – B : Answer any four full questions.

**PART – A**

Answer any five questions :

**(5×6=30)**

1. Briefly explain the need for 'dual' mode of operation in an OS.
2. What information about a process needs to be saved, changed or updated when context switching takes place ? How is this information represented ?
3. Discuss solution to the 2-process critical section problem. Mention the issues in this solution.
4. Suggest and explain one method each to avoid "Hold and Wait" and "Circular Wait" condition for deadlock prevention.
5. Explain the use of a Translation Look aside Buffer.
6. What is thrashing ? Discuss the reasons for its cause.
7. Given the snapshot of a system with three processes,  $P_0$ ,  $P_1$  and  $P_2$  with burst time of 8 ms, 4 ms and 1 ms respectively, calculate the average turnaround time and average wait time for each of the processes for SJF scheduling.
8. With supporting diagrams, distinguish between single-level and two-level directory structure.

**PART – B**

Answer any four full questions.

**(4×10=40)**

- 9 a) Discuss the methodologies used to implement inter-process communication with suitable examples. 5
- b) Elaborate system models used for deadlock representation and how they can be used to detect deadlocks. 5

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10. a) Discuss the role of a semaphore in solving the critical section problem. Explain the approach to solving the producer-consumer problem. 5  
b) Explain Readers-Writers problem of synchronization. 5
11. a) What is contiguous memory allocation? Elucidate the need for memory protection phase before memory allocation phase. 5  
b) Explain Virtual Memory. Discuss how paging is used to implement Virtual Memory. 5
12. a) Given that main memory is composed of three page frames for public use and that a program requests pages in the following order :  
A, B, A, C, D, A, B, D, B, A, C, A, C, D.  
Using FIFO and LRU page replacement algorithms, do a page trace analysis and compute the page faults. 6  
b) What is Belady's anomaly? Explain. 4
13. a) What is a file? Explain the various file allocation methods. 6  
b) Explain : 4  
i) Bootstrap program  
ii) Swap space management.
14. Write short notes on : (2x5=10)  
i) System Calls for file management.  
ii) Access Matrix.