

II Semester M.C.A. Examination, June/July 2018  
(CBCS)  
COMPUTER SCIENCE  
MCA 204T : Operating Systems

Time : 3 Hours

Max. Marks : 70

*Instruction : Answer any five from Part – A and any four from Part – B.*

PART – A

Answer any five questions.

(5×6=30)

1. List and explain the services of operating system.
2. Explain process state with state transition diagram.
3. Explain Mutex software tools to solve the critical-section problem.
4. Describe two types of latencies that affect the performance of real-time CPU scheduling.
5. What is deadlock? What are the necessary conditions an OS must satisfy for a deadlock to occur?
6. Distinguish between external fragmentation and internal fragmentation.
7. What are the operations that are performed on a directory?
8. Define domain protection. Explain with an example.

PART – B

Answer any four full questions.

(4×10=40)

8. a) Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems? 5
- b) What is the purpose of system calls? What are the system calls provided by operating system in controlling process and file manipulation? 5

10. Consider the following snapshot of the system where length of the CPU burst given in milliseconds.

10

Process	Burst time
$P_0$	9
$P_1$	6
$P_2$	10

11. a) Define Semaphores. Explain the implementation of semaphores in solving dining-philosophers problem.

b) Consider the following snapshot of the system

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
$P_0$	0	1	0	7	5	3	3	9	2
$P_1$	2	0	0	3	2	2			
$P_2$	3	0	2	9	0	2			
$P_3$	2	1	1	2	2	2			
$P_4$	0	0	2	4	3	3			

i) Compute need matrix

ii) Find out safe sequence of processes execution without deadlock.

12. a) Explain with an example of three different steps in binding of instructions and data to memory addresses.  
b) Explain Demand paging with neat diagram.
13. a) What is file ? Explain in detail different allocation methods.  
b) Explain the difference between protection and security.
14. Write short notes on :
  - a) Virtual Machines.
  - b) Thread.
  - c) Starvation and Aging.
  - d) Swapping.



PG – 388

**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

P.T.O.



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 : (2×5=10)  
i) System Calls for file management.  
ii) Access Matrix.
-



PG – 513

II Semester M.C.A. Degree Examination, June/July 2015  
(CBCS)  
COMPUTER SCIENCE  
MCA-204T : Operating System

Time : 3 Hours

Max. Marks : 70

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

PART – A

Answer any five questions : (5×6=30)

1. Briefly describe the objectives and functions of an operating system.
2. Define system call. Describe the system call related to process management.
3. What is critical section ? Explain Peterson solution to the 2-process critical section problem.
4. Describe the differences among short terms, medium term and long term scheduling.
5. What is resource allocation graph ? How can you ascertain the presence of a deadlock from a graph ?
6. Explain FCFS and SJF scheduling algorithms.
7. Describe shortest seek time first and C-scan disk scheduling algorithms.
8. What is domain protection ? Explain with an example.

PART – B

Answer any four full questions : (4×10=40)

9. a) What are the characteristics of modern operating system ? Discuss. 6  
b) Differentiate between user-level and kernel-level threads. 4
10. What is fragmentation ? Discuss how fragmentation is handled by the operating system. 10

P.T.O.



11. What are semaphores ? Explain how semaphores can be used to solve readers-writers problem. 10

12. Consider the following snap shot of the system.

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P <sub>0</sub>	0	0	1	0	0	1	1	5	2
P <sub>1</sub>	1	0	0	1	7	5			
P <sub>2</sub>	1	3	5	2	3	5			
P <sub>3</sub>	0	6	3	0	6	5			

Answer the following using Banker's Algorithm.

- a) Is the system in a safe state ? If so identify the safe sequence. 4
  - b) If a request from process P<sub>1</sub> arrives for (0, 5, 2) can the request be granted immediately ? 3
  - c) What would be the new system state after the allocation ? 3
13. a) Discuss different directory storing mechanisms. 6
- b) How is security handled by the operating system ? 4
14. Write short notes on :
- a) Page replacement algorithms. 4
  - b) PCB. 3
  - c) Dining Philosophers problem. 3