SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY

(AUTONOMOUS)

III B. Tech I Sem – Question Bank

OPERATING SYSTEMS

[R204GA05503]

(Computer Science and Engineering)

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CO	COURSE OUTCOMES	BL
CO1	Explain the fundamentals of operating systems like process, memory, storage, file system, security and protection.	Understand
CO2	Illustrate various operating System services, interfaces and system calls.	Apply
CO3	Demonstrate critics of process management and IPC.	Apply
CO4	Implement page replacement algorithms, memory management techniques and deadlock issues.	Apply
CO5	Illustrate architecture of file systems and I/O systems for mass storage structures.	Apply
CO6	Utilize the methods of operating system security and protection.	Apply

***Note:** 1.Remeber(**R**), 2.Understand (**U**), 3. Apply (**A**) 4. Analyze (**An**), 5. Evaluate (**E**), 6. Create(**C**)*

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UNIT – 1 (2 Marks)			
#	Questions	CO	BL
1	Define System Call.	CO2	Remember
2	Define Operating System.	CO1	Remember
3	Classify Resources that is managed by OS.	CO2	Remember
4	Define Process.	CO1	Remember
5	Draw State Diagram of a Process.	CO1	Remember
6	Compare multi-programming system and multi-tasking system	CO1	Remember
7	Draw User Mode to Kernel Mode Transitions.	CO2	Remember
8	Draw Memory Layout for Multi-Programmed system.	CO2	Remember
9	Explain different operations performed by the operating system.	CO2	Remember
10	How parameters can pass to system calls?	CO2	Remember

UNIT – 1 (5/10 Marks)				
#	Questions	M	CO	BL
1	Illustrate operating system operations with neat sketches.	5/10	CO2	Understand
2	Describe multiprogramming and Multi-tasking systems.	5/10	CO1	Understand
3	Explain the illusion of virtualization with a neat diagram.	5/10	CO2	Understand
4	Illustrate the importance of Security and Protection.	5/10	CO2	Understand
5	Explain about the dual mode operation in OS with a neat block diagram.	5/10	CO2	Understand
6	Illustrate various computing environments that need OS.	5/10	CO2	Understand
7	Exemplify open system call Scenario with a neat diagram.	5/10	CO2	Understand
8	Illustrate operating system services with a neat block diagram.	5/10	CO2	Understand
9	Explain in detail the role of Operating system as a resource Manager.	5/10	CO2	Understand
10	Explain how operating systems used in a variety of computing environments.	5/10	CO2	Understand
11	Explain in detail the role of Operating system as a resource Manager.	5/10	CO2	Understand
12	Explain how operating systems are used in a variety of computing environments	5/10	CO2	Understand

13	Explain about the dual mode operation in OS with a neat block diagram.	5/10	CO2	Understand

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UNIT – 2 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	Draw Process Layout in Memory.	CO3	Remember
2	Draw PCB.	CO3	Remember
3	Give an example of a Process State Transition diagram.	CO3	Remember
4	What is a thread? What are the differences between process and thread?	CO3	Remember
5	What is scheduling? What criteria affect the scheduler's performance?	CO3	Remember
6	What necessary conditions can lead to a deadlock situation in a system?	CO3	Remember
7	List out any two reasons for process termination.	CO3	Remember
8	Give some benefits of multithreaded programming.	CO3	Remember
9	Define a trap.	CO3	Remember
10	Define Race Condition.	CO3	Remember
11	List requirements to solve critical section problem.	CO3	Remember

UNIT – 2 (5/10 Marks)				
#	**Questions**	**M**	**CO**	**BL**
1	Construct Critical section problem with a suitable example.	5/10	CO3	Understand
2	Construct IPC for message-passing Model with a suitable example.	5/10	CO3	Understand
3	Write a C program to create a child process that display list of files in current working directory.	5/10	CO3	Understand
4	Construct a memory layout diagram for a C Program.	5/10	CO3	Understand
5	Write structural Code for a PCB.	5/10	CO3	Understand
6	Define Cooperative Process. Illustrate Communication Models for IPC with a suitable example.	5/10	CO3	Understand
7	Construct producer-consumer problem with a suitable example.	5/10	CO3	Understand
8	Discuss about user-level threads. What are its advantages and disadvantages?	5/10	CO3	Understand
9	Make a comparison between the process and threads.	5/10	CO3	Understand
10	What are the essential properties of critical section implementation? Explain.	5/10	CO3	Understand
11	Describe the Peterson’s solution for the race condition with algorithm.	5/10	CO3	Understand
12	Draw structure of a process.	5/10	CO3	Understand
13	Write C Programs that illustrate the problem of Race Condition.	5/10	CO3	Apply

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UNIT – 3 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	What is the basic function of paging?	CO4	Understand
2	What are the differences between paging and segmentation?	CO4	Understand
3	What is the purpose of reallocation Register?	CO4	Understand
4	What do you by degree of multiprogramming system?	CO4	Understand
5	Define Compaction.	CO4	Understand
6	What do you mean by swapping?	CO4	Remember
7	Write basic replacement Algorithm.	CO4	Understand
8	What do you mean by Belady’s Anomaly?	CO4	Remember

9	List methods to implement LRU Page Replacement Algorithm.		CO4	Understand
10	Classify Counting Algorithms for a Page Relpacement.		CO4	Understand
	UNIT – 3 (5/10 Marks)			
#	**Questions**	**M**	**CO**	**BL**
1	Demonstrate the causes of trashing with a suitable diagram.	5/10	CO4	Understand
2	Illustrate Continuous Memory Allocation with a suitable example.	5/10	CO4	Understand
3	Briefly explain demand paging. List out advantages and disadvantages of demand paging.	5/10	CO4	Understand
4	Compare and contrast the physical and virtual memory.	5/10	CO4	Apply
5	Discuss about optimal page replacement algorithm. If the contents of reference string is: 0, 2, 1, 6, 4, 0, 1, 0, 3, 1, 2, 1 and there are four frames available in the memory then find page fault and page fault rate using optimal page algorithm.	5/10	CO4	Apply
6	Given page reference string: 1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. Compare the number of page faults for LRU, FIFO and Optimal page replacement algorithm.	5/10	CO4	Apply
7	What are the different methods of handling deadlock?	5/10	CO4	Apply
8	Explain the difference between internal and external fragmentation.	5/10	CO4	Apply
9	Given six memory partitions of 300 KB, 600 KB, 350 KB, 200 KB, 750 KB, and 125 KB (in order), how would the first-fit, best-fit, and worst-fit algorithms place processes of size 115 KB, 500 KB, 358 KB, 200 KB, and 375 KB (in order)? Rank the algorithms in terms of how efficiently they use memory.	5/10	CO4	Apply
10	Consider the table given below for a system, find the need matrix and the safety sequence, using Banker's algorithm. Resource – 3 types A – (10 instances) B – (5 instances) C – (7 instances) Process / Allocation (A B C) / Maximum (A B C) / Available (A B C) p_0 0 1 0 / 7 5 3 / 3 3 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	5/10	CO4	Apply
11	Explain any two solutions of Recovery from Deadlock	5/10	CO4	Understand
12	Explain about the bankers algorithm for deadlock avoidance	5/10	CO4	Understand
13	What is deadlock? Explain the conditions that lead to deadlock.	5/10	CO4	Understand
14	Explain about Swapping.	5/10	CO4	Understand
15	Consider the following page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 With four Frames. How many page faults would occur for the FIFO, Optimal page replacement algorithms? Which algorithm is efficient? (Assume all frame are initially empty)	5/10	CO4	Apply
16	What is Thrashing? Explain the Causes of Thrashing.	5/10	CO4	Understand
17	What is the need of Page Replacement? Consider the following reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Find the number of Page Faults with FIFO, Optimal Page replacement and LRU with four frames which are empty initially. Which algorithm gives the minimum number of page faults?	5/10	CO4	Apply

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UNIT – 4 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	Enumerate the different RAID levels.	CO5	Remember
2	What attributes are considered for designing the file structure for an Operating System?	CO5	Remember
3	What is the difference between synchronous I/O and asynchronous I/O?	CO5	Remember
4	Assume that each block of size 256 KB. Allocation method is used is contiguous allocation. Directory entry for the file is (File, Start:24, Length:16). Find the file size.	CO5	Remember
5	Assume that size of each block in a disk is 1MB, and bit vector is 00111100111100111101111100. Find the free space in the disk.	CO5	Remember
6	What is file access mechanism? And list out the access mechanisms.	CO5	Remember
7	When designing the file structure for an operating system, what attributes are considered.	CO5	Remember
8	Classify the services provided by the I/O subsystem.	CO5	Remember
9	Define trapdoor.	CO5	Remember
10	Define file.	CO5	Remember
11	Classify Dimensions of Application I/O Interface.	CO5	Remember
12	Compute the average latency of a disk spindle rotates with 7200 RPM.	CO5	Remember
13	Define disk Bandwidth	CO5	Remember

UNIT – 4 (5/10 Marks)				
#	**Questions**	**M**	**CO**	**BL**
1	Explain the different Disk scheduling algorithms with their comparisons	5/10	CO5	Understand
2	Explain the concept of a file. Discuss the different file access mechanisms in detail.	5/10	CO5	Understand
3	Explain the different components of I/O Hardware and different layers of I/O Software.	5/10	CO5	Understand
4	Write the principle of working of any five disk scheduling algorithms.	5/10	CO5	Understand
5	Briefly explain about Acyclic Graph Directory Structure.	5/10	CO5	Understand
6	A UNIX file system has 1-KB blocks and 4-byte disk addresses. What is the maximum file size if i-node contain 10 direct entries, and one single, double, and triple indirect entry each?	5/10	CO5	Understand
7	Give a note on application I/O interface.	5/10	CO5	Understand
8	Explain the disk structure and disk attachment.	5/10	CO5	Understand
9	Give a brief note on worm disk and tapes.	5/10	CO5	Understand
10	List and explain different directory implementations	5/10	CO5	Understand
11	What data are needed to manage open files? Explain	5/10	CO5	Understand
12	What is the purpose of I/O system calls and device-driver? How do the devices vary	5/10	CO5	Understand
13	Discuss about block and character devices.	5/10	CO5	Understand
14	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The current head position is at cylinder 143. The queue of pending requests is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance that the disk arm moves to satisfy all the pending requests for each of the following Disk scheduling algorithms? a) SSTF b) SCAN	5/10	CO5	Apply
15	What is File system and what are the various File access methods? Explain.	5/10	CO5	Understand
16	Suppose that a disk drive has 5000 cylinders numbered 0 to 4999. The drive is currently serving a request at cylinder 143. The queue of pending requests in FIFO order 86,1470,913,1774,948,1509, 1022, 1750, 130 starting from current	5/10	CO5	Apply

	head position. What is the total distance that disk arm moves to satisfy all the pending request for FCFS and SSTF disk scheduling algorithm.			
17	Explain about the system call for File operations.	5/10	CO5	Understand
18	Explain the following disk scheduling algorithm with proper diagram	5/10	CO5	Understand
19	Illustrate the methods implemented in an I/O hardware with suitable diagrams.	5/10	CO5	Understand
20	Illustrate various types of storage attachment with suitable diagrams.	5/10	CO5	Understand
21	Explain How I/O requests are transformed to Hardware Operations	5/10	CO5	Understand

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UNIT – 5 (2 Marks)			
#	**Questions**	**CO**	**BL**
1	Define system threats. What is known as DOS attack?	CO6	Remember
2	Define man in the middle in security attacks.	CO6	Remember
3	List the goals of protection	CO6	Remember
4	Define Access Matrix.	CO6	Remember
5	What is Access Control?	CO6	Understand
6	What are the main differences between capability lists and access lists	CO6	Remember
7	List Security violation methods.	CO6	Remember
8	List security Violation Categories.	CO6	Remember
9	How security levels are measured?	CO6	Remember
10	What is keystroke logger?	CO6	Remember
11	Define Virus.	CO6	Remember

UNIT – 5 (5/10 Marks)				
#	**Questions**	**M**	**CO**	**BL**
1	Illustrate various access matrix implementation techniques.	5/10	CO6	Understand
2	Explain about access matrix in detail.	5/10	CO6	Understand
3	Define Access control. Explain revocation of Access rights.	5/10	CO6	Understand
4	Define system threat. Give example of system threats.	5/10	CO6	Understand
5	Explain the protection mechanism illustrating the use of protection domain and access control list.	5/10	CO6	Understand
6	Describe the principles of protection. Explain the access matrix in detail.	5/10	CO6	Understand
7	Explain about domains of Protection	5/10	CO6	Understand
8	Illustrate role-based access Control with suitable diagrams.	5/10	CO6	Understand
9	Explain how Morris internet worm occurs with a suitable diagram.	5/10	CO6	Understand
10	Illustrate encryption methods with suitable scenarios.	5/10	CO6	Understand
11	Illustrate Authentication methods.	5/10	CO6	Understand

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