



INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

Dundigal, Hyderabad - 500 043

COMPUTER SCIENCE AND ENGINEERING (DATA SCIENCE)

QUESTION BANK

Course Title	OPERATING SYSTEMS				
Course Code	ACSC12				
Program	B.Tech				
Semester	III	DS			
Course Type	Core				
Regulation	IARE - UG20				
Course Structure	Theory			Practical	
	Lecture	Tutorials	Credits	Laboratory	Credits
	3	-	3	-	1
Course Coordinator	Ms S. Swarna Keerthi, Assistant Professor				

COURSE OBJECTIVES:

The students will try to learn:

I	The principles of operating system, its services and functionalities with the evolution of operating systems.
II	The concepts of processes, inter-process communication, synchronization and scheduling used in process management.
III	The concepts related to memory management, paging, and segmentation including protection and security mechanisms used in computer systems.
IV	The deeper insights into the reasons for deadlock occurrences, techniques used for deadlock detection, prevention and recovery.

COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	Describe the importance of computer system resources for designing operating systems security policies.	Remember
CO 2	Demonstrate process control blocks and threads used in scheduling the process.	Understand

CO 3	Classify the importance of system calls to different Applications Programming Interface in developing operating systems.	Understand
CO 4	Construct the critical section problem used and correlations with due consideration of performance measures.	Apply
CO 5	Distinguish logical and physical address space applied in process management	Analyze
CO 6	Construct various page replacement algorithms applied for allocation of frames.	Understand
CO 7	Describe the use of storage management policies with respect to different storage management technologies.	Remember
CO 8	Classify the different access methods used for file management systems.	Analyze
CO 9	Demonstrate the working of operating systems as a resource manager and file system manager used for implementing different parts of operating systems.	Understand
CO 10	Describe the concept of free space management to improve efficiency and performance of operating systems.	Understand
CO 11	Make use of various methods of handling deadlocks used for system models.	Apply
CO 12	Make use of access rights of handling deadlocks used for system models.	Apply

QUESTION BANK:

Q.No	QUESTION	Taxonomy	How does this subsume the level	CO's
MODULE I				
INTRODUCTION				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Distinguish between batch systems and time sharing systems.	Apply	This would require the learner to remember, understand and apply about the evolution of OS	CO 2
2	Distinguish between hard real time systems and soft real time systems	Understand	This would require the learner to recall the hard real time systems and soft real time systems	CO 3
3	What are the three main purposes of an operating system?	Understand	This would require the learner to recall the OS	CO 3
4	What is a distributed operating system? What are the advantages of a distributed operating system?	Apply	This would require the learner to recall the evolution systems.	CO 2

5	Explain why you think that idleness in CPU occurs.	Understand	This would require the learner to recall the CPU occurs.	CO 3
6	Explain the difference between interrupt and exception.	Understand	This would require the learner to recall the interrupt and exception.	CO 3
7	Differentiate between tightly coupled systems and loosely coupled systems.	Understand	This would require the learner to recall the Coupled systems	CO 3
8	Explain Is OS is a resource manager. If so justify your answer	Understand	This would require the learner to recall the OS is a resource manager.	CO 3
9	Discuss the view of an operating system as a resource manager.	Understand	This would require the learner to recall the resource manager.	CO 3
10	Define essential properties of the following types of Operating system: i) Batch operating system ii) Interactive operating system iii) Time sharing operating system iv) Real time operating system v) Distributed operating system.	Understand	This would require the learner to recall the types of OS.	CO 3
PART - B (LONG ANSWER QUESTIONS)				
1	Define an operating system. State and explain the basic functions or services of an operating system	Remember	This would require the learner to recall the OS	CO 2
2	Explain the differences between multiprogramming and time-sharing systems	Understand	This would require the learner to recall the multiprogramming and time-sharing systems	CO2
3	Explain how operating system services are provided by system calls.	Understand	This would require the learner to recall the system calls.	CO 1
4	Describe the operating system structures.	Remember	This would require the learner to recall the OS structures.	CO 2
5	Distinguish between user mode and kernel mode operations of the operating System	Remember	This would require the learner to recall the operations of the Operating Systems	CO 3
6	Define the essential properties of the operating systems.	Understand	This would require the learner to recall the OS	CO 2

7	Explain the architecture of an operating system.	Understand	This would require the learner to recall the architecture of an OS	CO 3
8	Distinguish between multiprogramming, multitasking and multiprocessing.	Remember	This would require the learner to recall the multi programming and multitasking and multiprocessing.	CO 3
9	Describe briefly about Batch programming	Understand	This would require the learner to recall the Batch programming.	CO 2
10	Define Multi Tasking and Multi Threading?	Remember	This would require the learner to recall the multitasking and Multithreading	CO 1
11	Draw and explain the architecture of windows 2000 and traditional UNIX	Understand	This would require the learner to recall the UNIX	CO 3
12	State the differences between system call and system program.	Understand	This would require the learner to recall the System program.	CO 2
13	Distinguish between the client-server and peer-to-peer models of distributed systems.	Understand	This would require the learner to recall the Peer to peer models	CO 2
14	Explain types of System calls.	Understand	This would require the learner to recall the System calls	CO 3
15	Describe the kernel structure of the operating system.	Understand	This would require the learner to recall the Kernel structure of OS	CO 3
16	Discuss about evolution of operating system	Understand	This would require the learner to recall the Evolution of OS	CO 1
17	Explain about system call between user mode and kernel mode.	Understand	This would require the learner to recall the Use mode and kernel mode.	CO 3
18	Compare Multiprogramming and Multitasking	Understand	This would require the learner to recall the Multiprogramming and Multi-Tasking	CO 2
19	Explain various types of computer systems	Understand	This would require the learner to recall the Types of computer system	CO 2

20	Explain about client -server models	Understand	This would require the learner to recall the distributed systems	CO 2
PART-C SHORT ANSWER QUESTIONS				
1	Define Operating Systems.	Remember	Recall the definition of Operating systems	CO 1
2	Define Distributed Systems.	Remember	Remember the definition of Distributed Systems	CO 1
3	How user mode is different from kernel mode?	Remember	This would require the learner to recall about the kernel mode	CO 2
4	Define Multiprocessor system?	Remember	This would require the learner to recall about the multiprocessor system	CO 1
5	Define System call?	Remember	This would require the learner to recall the system call.	CO 1
6	Define interrupt?	Remember	This would require the learner to recall the interrupt	CO 2
7	Define Time Sharing Systems?	Remember	This would require the learner to recall the Time sharing system	CO 3
8	Write the various types of OS components?	Remember	This would require the learner to recall the types of OS components	CO 3
9	List any four functions of the Operating system?	Remember	This would require the learner to recall the Functions of OS	CO 1
10	Define Kernel.	Remember	This would require the learner to recall the Kernel	CO 2
11	Define a real time operating system.	Remember	This would require the learner to recall the RTOS	CO 1
12	Define Virtual Machine?	Remember	This would require the learner to recall the VM	CO 2
13	Explain how protection is provided for the hardware resources by the operating system.	Understand	This would require the learner to recall the hardware resources by OS	CO 1
14	Discuss about batch systems?	Remember	Recall the batch systems	CO 2
15	Explain about a parallel distributed system?	Understand	This would require the learner to recall and understand about distributed system	CO 1

16	Discuss about OS architecture?	Remember	This would require the learner to recall the OS architecture.	CO 2
17	Discuss about protection and security by OS?	Remember	This would require the learner to recall the protection and security	CO 2
18	What are the advantages of layered structure?	Remember	This would require the learner to recall the Layered Structure	CO1
19	Define Virtual Memory?	Remember	This would require the learner to recall the VM	CO 2
20	Describe the use of fork () and exec () system calls?	Remember	This would require the learner to recall the System calls	CO 3
MODULE II				
PROCESS AND CPU SCHEDULING, PROCESS COORDINATION				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Suppose we have a single processor system, and jobs arrive at a rate of 10 jobs a Seconds, suppose each job takes an average of 50 milliseconds to complete. Assume that both distributions are exponential. State the expected number of jobs in the system and the average time in the system.	Apply	This would require the learner to recall the process	CO 5
2	Consider the following table of arrival time and burst time for three processes P0, P1 and P2. Process Arrival time Burst Time P0 0 ms 9 ms P1 1 ms 4 ms P2 2 ms 9 ms The pre-emptive shortest job first scheduling algorithm is used. Scheduling is carried out only at arrival or completion of processes. What is the average waiting time for the three processes?	Understand	This would require the learner to recall the process.	CO 5
3	What are the 3 different types of scheduling queues?	Apply	This would require the learner to recall the Scheduling queues.	CO 5

4	Explain the advantage of using semaphores over Test And Set () and Swap () functions. Describe the use of wait () and signal () functions on semaphore and how these can provide the solution to the Critical section problem.	Understand	This would require the learner to recall the Functions.	CO 5
5	Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm. Do not count the context switches at time zero and at the end	Understand	This would require the learner to recall the process.	CO 5
6	Construct Process Control Block for any Given example.	Apply	This would require the learner to recall the PCB	CO 5
7	Explain Four jobs to be executed on a single processor system arrive at time 0 in the order A, B, C, D. their burst CPU time requirements are 4, 1, 8, 1 time units respectively. The completion time of A under round robin scheduling with a time slice of one time unit is?	Understand	This would require the learner to recall the Processor.	CO 5
8	Explain the concept of multi-threading. Discuss the following multithreading models. a) Many-to-one b) One-to-one c) Many-to-many d) Two-level	Apply	This would require the learner to recall the Multi-threading.	CO 4
9	Write about Peterson's Solution.	Apply	This would require the learner to recall Peterson's Solution.	CO 5
10	Distinguish between monitor and semaphore. Explain in detail a monitor with notify and broadcast functions using an example.	Apply	This would require the learner to recall the Monitor and semaphore.	CO 4

PART-B LONG ANSWER QUESTIONS				
1	Describe process scheduling. Explain the various levels of scheduling.	Remember	This would require the learner to recall the process scheduling.	CO 4
2	Explain the process state transition diagram with examples.	Understand	This would require the learner to recall the state transition diagram.	CO 5
3	Explain handle pruning in detail with example?	Understand	This would require the learner to recall the handle pruning.	CO 5
4	What do you mean by PCB? Where is it used? What are its contents? Explain	Understand	This would require the learner to recall the PCB.	CO 5
5	Explain direct and indirect communications of message passing systems.	Understand	This would require the learner to recall the direct and indirect communications.	CO 5
6	What is a process? Draw and explain process state diagram	Understand	This would require the learner to recall the Process.	CO 6
7	Distinguish between monitor and semaphore	Remember	This would require the learner to recall the monitor and semaphore.	CO 5
8	Discuss the attributes of the process. Describe the typical elements of process control block	Remember	This would require the learner to recall the PCB	CO 5
9	What is the purpose of the system calls and system programs?	Understand	This would require the learner to recall the System calls and System programs	CO 4
10	List out the various process states and briefly explain the same with a state diagram.	Understand	This would require the learner to recall the PCB.	CO 5
11	What is the purpose of a command interpreter? Why is it usually separate from the kernel?	Remember	This would require the learner to recall the command interpreter.	CO 5
12	What are different differences between user level threads and Kernel supported threads?	Understand	This would require the learner to recall the threads.	CO 5
13	What is a Scheduler? What is a dispatcher?	Understand	This would require the learner to recall the Scheduler.	CO 5
14	Discuss the following CPU scheduling algorithms a) Round robin b) Shortest Job	Remember	This would require the learner to recall the CPU scheduling.	CO 5

15	Discuss the following CPU scheduling algorithms a) first come first serve b) Priority	Understand	This would require the learner to recall the CPU scheduling.	CO 5
16	Discuss the following. a) CPU-I/O burst cycle b) CPU schedule c) Pre-emptive and non-preemptive scheduling d) Dispatcher	Understand	This would require the learner to recall the CPU scheduling.	CO 5
17	Compare between Job-scheduling and CPU-scheduling.	Understand	This would require the learner to recall the CPU scheduling.	CO 5
18	Discuss the attributes of the process. Describe the typical elements of process control block	Understand	This would require the learner to recall the PCB.	CO 5
19	Define semaphore. Explain the method of application of semaphore for process synchronization.	Understand	This would require the learner to recall the semaphore.	CO 5
20	Discuss about following? a) Process b) Components of process c) Program versus process d) Process states	Understand	This would require the learner to recall the process.	CO 5
PART-C SHORT ANSWER QUESTIONS				
1	Define process.	Remember	This would require the learner to recall the process.	CO 4
2	Define thread?	Remember	This would require the learner to recall the thread.	CO 4
3	Describe context switching	Remember	This would require the learner to recall the context switching.	CO 5
4	What is the information maintained in a PCB.	Remember	This would require the learner to recall the PCB.	CO 5
5	Define process state and mention the various states of a process.	Remember	This would require the learner to recall the process.	CO 5
6	Define CPU scheduling.	Remember	This would require the learner to recall the CPU scheduling.	CO 5
7	State critical section problem	Remember	This would require the learner to recall the critical Section problem.	CO 5
8	Distinguish between thread with process.	Remember	This would require the learner to recall the thread	CO 5
9	Distinguish between user threads and kernel threads	Remember	This would require the learner to recall the thread.	CO 5

10	Define turnaround time.	Remember	This would require the learner to recall the turnaround time.	CO 5
11	List the various scheduling criteria for CPU scheduling.	Remember	This would require the learner to recall the CPU scheduling.	CO 5
12	Describe entry and exit sections of a critical section	Understand	This would require the learner to recall the entry and exit sections.	CO 5
13	Define semaphores.	Remember	This would require the learner to recall the semaphores.	CO 6
14	Explain different ways in which a thread can be cancelled.	Understand	This would require the learner to recall the thread.	CO 5
15	Write about Scheduling queues.	Remember	This would require the learner to recall the Scheduling.	CO 4
16	Explain the use of job queues, ready queues and device queues	Remember	This would require the learner to recall the job queues, ready queues and device queues.	CO 5
17	Explain bounded waiting in critical region.	Remember	This would require the learner to recall the critical region.	CO 5
18	State the factors on which the performance of the Round Robin CPU scheduling algorithm depends.	Understand	This would require the learner to recall the round robin CPU scheduling.	CO 5
19	Distinguish between semaphore and binary semaphore.	Remember	This would require the learner to recall the semaphore and binary semaphore.	CO 5
20	Distinguish between preemptive and non-preemptive scheduling techniques	Remember	This would require the learner to recall the preemptive and non-preemptive scheduling techniques	CO 5
MODULE III				
MEMORY MANAGEMENT AND VIRTUAL MEMORY				
PART A- PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				

1	Memory partitions of 100kb,500 kb,200 kb,300kb,600 kb are available .How would 7 best ,worst, first fit algorithms place processes 212,417,112,426 in order. Which is the best algorithm?	Apply	This would require the learner to recall the Best fit algorithms.	CO 7
2	Describe the LRU page replacement algorithm, assuming there are 3 frames and the page reference string is 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.	Apply	This would require the learner to recall the page faults.	CO 7
3	Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 .Find out the number of page faults a) LRU b) FIFO	Apply	This would require the learner to recall the Algorithms	CO 7
4	The queue of requests in FIFO is 86,147,91,177,94,150,102,175,130 What is the total head movement needed to satisfy the requests for the following Scheduling algorithms FCFS, SJF, SCAN	Apply	This would require the learner to recall the Scheduling Algorithms	CO 7
5	Discuss the following page replacement algorithm with an example i) Optimal ii) LRU	Apply	This would require the learner to recall the Page replacement Algorithms	CO 7
7	A process references 5 pages A,B, C, D, E in the following order A, B, C, D, A, E, B, C, E, D Assuming that the replacement algorithm is LRU and FIFO, find out the number of page faults during the sequence of references, starting with an empty main memory With 3 frames.	Apply	This would require the learner to recall the Replacement algorithm.	CO 8
8	Consider the following page reference string 7,0, 1,2,0,3,0,4,2,3,0,3,2, 1,2,0, 1, 7, 10 0, 1. How many page faults would occur for FIFO page replacement algorithms, assuming three frames?	Apply	This would require the learner to recall the Replacement algorithm.	CO 8

9	Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) how Would each of the first fit, best fit and worst fit algorithms workplace processes of 212 K, 417K, 112 K and 426 K (in order)? Which algorithm makes the most efficient use of memory?	Apply	This would require the learner to recall the efficient use of memory.	CO 8
10	Consider a logical address space of eight pages of 1024 words each mapped onto a physical memory of 32 frames a) How many bits are in the logical address. b) How many bits are in the physical address	Remember	This would require the learner to recall the physical Address.	CO 8
PART-B LONG ANSWER QUESTIONS				
1	Describe the following. a) Virtual Memory b) Cache Memory	Understand	This would require the learner to recall the Memory	CO 7
2	What is paging and swapping?	Understand	This would require the learner to recall the Paging and swapping	CO 7
3	With a diagram discuss the steps involved in handling a page fault.	Remember	This would require the learner to recall the page fault	CO 7
4	Describe a) Paging b) Page table structure	Understand	This would require the learner to recall the paging	CO 7
5	Explain in detail the requirements that memory management technique needs to satisfy	Understand	This would require the learner to recall the memory management	CO 7
6	Describe a) Translation look-aside buffer b) Segmentation	Understand	This would require the learner to recall the Segmentation	CO 7
7	Describe contiguous memory allocation concept with advantages and disadvantages	Remember	This would require the learner to recall the memory management.	CO 7
8	Describe Hierarchical paging .	Understand	This would require the learner to recall the paging	CO 7
9	Describe Inverted page Table	Understand	This would require the learner to recall the page table	CO 7
10	Explain briefly about paging with a neat diagram.	Understand	This would require the learner to recall the Paging	CO 7
11	Explain the uses of the following: a. Mutex object b. Semaphore object	Understand	This would require the learner to recall the Mutex and semaphore.	CO 8

12	Define page fault. When does a page fault occur.	Understand	This would require the learner to recall the page fault.	CO 8
13	Describe the action taken by OS when page fault occurs.	Understand	This would require the learner to recall the page fault.	CO 8
14	Write a note on file types and file structures .	Remember	This would require the learner to recall the files	CO 8
15	Explain with the help of supporting diagrams how TLB improves the performance of a demand paging system.	Understand	This would require the learner to recall the demand paging.	CO 8
16	Differentiate between global and local replacement algorithms	Understand	This would require the learner to recall the page replacement algorithms.	CO 8
17	What is virtual memory? Explain Suppose we have a demand paged memory. The page table is held in registers. It takes 8ms to service a page fault if an empty page is available or the replaced page is not modified, and 20ms if the replaced page is modified. memory access time is 100ns. Assume that the page to be replaced is modified 70% of the time. What is the maximum acceptable page fault rate for an effective access time of no more than 200ns?	Understand	This would require the learner to recall the Virtual Machine	CO 8
18	Explain the basic concepts of segmentation with neat diagrams	Understand	This would require the learner to recall the Segmentation.	CO 8
19	Explain the uses of the following: a) Mutex object b) Semaphore object c) Waitable timer object.	Understand	This would require the learner to recall the Mutex and semaphore.	CO 8
20	Explain briefly the performance of demand paging with necessary examples	Understand	This would require the learner to recall about the demand paging.	CO 8

PART-C SHORT ANSWER QUESTIONS				
1	Define compaction.	Remember	This would require the learner to recall the compaction	CO 7
2	Define swapping.	Remember	This would require the learner to recall the swapping.	CO 7
3	Explain the main function of the memory-management unit	Remember	This would require the learner to recall the memory management.	CO 7
4	Distinguish between logical address and physical address.	Understand	This would require the learner to recall the logical address and physical address.	CO 7
5	Compare synthesized and inherited attributes?	Understand	This would require the learner to recall the inherited attributes	CO 7
6	Describe dynamic loading and dynamic linking.	Remember	This would require the learner to recall the Memory management.	CO 7
7	Distinguish between compile time, load time and execution time address binding.	Remember	This would require the learner to recall the memory management.	CO 7
8	Distinguish between internal and external fragmentation.	Remember	This would require the learner to recall the fragmentation.	CO 7
9	List dynamic storage allocation strategies in contiguous memory allocation schemes.	Understand	This would require the learner to recall the memory management.	CO 7
10	List and define non-contiguous memory allocation schemes.	Remember	This would require the learner to recall the memory management .	CO 7
11	What is virtual memory?	Remember	This would require the learner to recall the Virtual machine.	CO 8
12	Differentiate between demand paging and pure demand paging.	Remember	This would require the learner to recall the Paging.	CO 8
13	Differentiate between local and global page replacement strategies.	Understand	This would require the learner to recall the Paging	CO 8
14	Explain the need for page-replacement	Remember	This would require the learner to recall the Page replacement	CO 8
15	Distinguish between paging and segmentation	Remember	This would require the learner to recall the Paging	CO 8

16	Explain any two page replacement algorithms	Remember	This would require the learner to recall the Page replacement algorithms.	CO 8
17	List various page replacement algorithms.	Understand	This would require the learner to recall the page replacement	CO 8
18	Explain the concept of thrashing and why thrashing should be avoided in a system.	Understand	This would require the learner to recall the Thrashing.	CO 8
19	What is virtual memory and give its advantages	Remember	This would require the learner to recall the Virtual memory	CO 8
20	What is demand paging? Explain	Remember	This would require the learner to recall the paging	CO 8
MODULE IV				
FILE SYSTEM INTERFACE, MASS-STORAGE STRUCTURE				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS)				
1	A hard disk has 63 sectors per tracks, 10 platters each with 2 recording surfaces and 1000 cylinders. The address of a sector is given as a triple $\langle c, h, s \rangle$ where c is the cylinder number, h is the surface number and s is the sector number. Thus 0th sector is addressed as $\langle 0, 0, 0 \rangle$, the 1st sector is Addressed as $\langle 0, 0, 1 \rangle$ and so on. Calculate the address of 1050thsector	Understand	This would require the learner to recall the physical and logical addresses	CO 9
2	Explain about allocation methods of a file with example . .	Understand	This would require the learner to recall the files	CO 9
3	Discuss the reasons why the operating system might require accurate information on how blocks are stored on disk. how could operating system improves file system performance with this knowledge	Understand	This would require the learner to recall the disk storage and file system performance	CO 10
4	What is a Directory? Write short note on Directory implementation	Understand	This would require the learner to recall the file systems	CO 10

5	Suppose the head of a moving head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125.If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175,130. What is the total head movement to satisfy these requests for the following disk scheduling algorithms? A.C-SCAN B. SSTF C. C-LOOK .	Understand	This would require the learner to recall the organization of files	CO 10
6	What is file system mounting. and Explain file types briefly	Understand	This would require the learner to recall the table storage	CO 10
7	What are file protection methods?	Understand	This would require the learner to recall the file production	CO 10
8	Explain about access methods and its types in briefly .	Understand	This would require the learner to recall the files	CO 10
9	Suppose we have files F1 to F4 in sizes of 7178, 572, 499 and 1195 bytes. Our disks have fixed physical block size of 512 bytes for allocation. Explain how many physical blocks would be needed to store these four files if we were to use a chained allocation strategy assuming that we need 5 bytes of information to determine the next block in the link. Which file results in the maximum internal fragmentation (measured as a percentage of the file size itself).	Understand	This would require the learner to recall the fragmentation	CO 10

10	Consider that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms. A. FCFS B. SSTF C. SCAN D. C-SCAN E. LOOK F. C-LOOK	Understand	This would require the learner to recall the scheduling algorithms .	CO 10
PART-B LONG ANSWER QUESTIONS				
1	Explain in detail the interrupts and interrupt handling features.	Understand	This would require the learner to recall the interrupts and handling features.	CO 9
2	Discuss about Disk space management	Remember	This would require the learner to recall the disk space management .	CO 9
3	Discuss about Swap –space management	Understand	This would require the learner to recall the Swap-space management.	CO 10
4	Describe the following Directory Implementation methods. a)Linear List b) Hash Table	Understand	This would require the learner to recall the Implementation Methods .	CO 10
5	Explain the concept of file sharing. What are the criteria to be followed in systems which implement file sharing	Understand	This would require the learner to recall the File Sharing.	CO 10
6	Explain the following file concepts: a) File attributes b) File operations	Understand	This would require the learner to recall the file concepts.	CO 9
7	Explain the following file concepts: a) File types b) Internal file structure	Understand	This would require the learner to recall the file concepts.	CO 10
8	Discuss the following a) File system mounting b)Thrashing	Understand	This would require the learner to recall the file concepts.	CO 10

9	Explain caching .	Understand	This would require the learner to recall the memory.	CO 9
10	Define buffering.	Understand	This would require the learner to recall the files.	CO 10
11	Write about spooling.	Understand	This would require the learner to recall the spooling	CO 10
12	Explain the techniques used for performing I/O	Understand	This would require the learner to recall the Techniques used for performing I/O	CO 9
13	Give an example of an application in which data in a file should be accessed in the following order: i. sequential ii. Random	Understand	This would require the learner to recall the File orders	CO 9
14	Explain the following in detail with respect to disk. a) Seek time b) Latency	Understand	This would require the learner to recall the seek time and latency with respect to disk	CO 10
15	Explain the following in detail with respect to disk. a)Access time b) Transfer time	Understand	This would require the learner to recall the access time and transfer time with respect to disk	CO 10
16	Define magnetic disk structure and its management.	Understand	This would require the learner to recall the magnetic disk structure and its management	CO 10
17	Explain swap space management.	Understand	This would require the learner to recall the swap space management	CO 10
18	Differentiate among the following disk scheduling algorithms. a) FCFS b) SSTF	Understand	This would require the learner to recall the scheduling algorithms	CO 10
19	Differentiate among the following disk scheduling algorithms. a) SCAN b) C-SCAN	Understand	This would require the learner to recall the scheduling algorithms	CO 10
20	Differentiate among the following disk scheduling algorithms. a) LOOK b) C-LOOK	Understand	This would require the learner to recall the scheduling algorithms	CO 10
PART-C SHORT ANSWER QUESTIONS				
1	Describe various file access method	Remember	This would require the learner to recall the files.	CO 10
2	Explain the following i)file types ii) file operation iii) file attributes.	Remember	This would require the learner to recall the files	CO 9

3	Define the terms – file, file path, directory.	Remember	This would require the learner to recall the files.	CO 9
4	Describe UFD and MFD.	Remember	This would require the learner to recall the UFD and MFD	CO 9
5	Describe file system mounting	Understand	This would require the learner to recall the files	CO 9
6	List the various layers of a file system.	Remember	This would require the learner to recall the file system,	CO 9
7	Explain the functions of the virtual file system (VFS).	Understand	This would require the learner to recall the virtual file system.	CO 9
8	Explain the allocation methods of a disk space.	Remember	This would require the learner to recall the disk space	CO 9
9	List the various layers of a file system.	Remember	This would require the learner to recall the layers of file system	CO 9
10	Describe about logical formatting of the disk.	Remember	This would require the learner to recall the formatting of the disk.	CO 9
11	List any four common file types and their extensions.	Understand	This would require the learner to recall the file types and extensions	
12	Explain any four common file attributes	Remember	This would require the learner to recall the file attributes.	CO 9
13	Explain any four file operations.	Remember	This would require the learner to recall the file operations.	CO 9
14	Distinguish between shared and exclusive locks.	Remember	This would require the learner to recall the locks.	CO 9
15	List any four secondary storage memory devices.	Remember	This would require the learner to recall the Storage memory devices.	CO 9
16	Define the terms with respect to disk I/O - seek time, latency time.	Understand	This would require the learner to recall the disk and its respective times	CO 10
17	Explain the information associated with an open file.	Remember	This would require the learner to recall the files.	CO 10

18	Discuss the advantages of contiguous memory allocation of disk space	Remember	This would require the learner to recall the disk space.	CO 10
19	Write a short note on procedures?	Understand	This would require the learner to recall the procedures.	CO 10
20	Discuss the drawbacks of contiguous allocation of disk space.	Remember	This would require the learner to recall the disk space.	CO 10
MODULE V				
DEADLOCKS, PROTECTION				
PART A-PROBLEM SOLVING AND CRITICAL THINKING QUESTIONS				
1	Consider the version of the dining-philosophers problem in which the chopsticks are placed at the center of the table and any two of them can be used by a philosopher. Assume that requests for chopsticks are made one at a time. Describe a simple rule for determining whether a particular request can be satisfied without causing deadlock given the current allocation of chopsticks to philosophers	Apply	This would require the learner to recall the deadlock	CO 12
2	Consider a system consisting of m resources of the same type being shared by n processes. A process can request or release only one resource at a time. Show that the system is deadlock free if the following two conditions hold: a) The maximum need of each process is between one resource and m resources. b) The sum of all maximum needs is less than m +n.	Apply	This would require the learner to recall the resources	CO 12

3	Given 3 processes A,B and C, three resources x,y and z and following events, a. A requests x ii) A requests y iii) B requests y iv) B requests z v) C requests z vi) C requests x vii) C requests y Assume that requested resources should always be allocated to the request process if it is available. Draw the resource allocation graph for the sequences. And also mention whether it is a deadlock? If it is, how to recover the deadlock	Apply	This would require the learner to recall the recovery from deadlock	CO 12
4	Explain How does the principle of least privilege aid in the creation of protection systems	Apply	This would require the learner to recall the protection of system	CO 12
5	Describe how the Java protection model would be compromised if a Java program were allowed to directly alter the annotations of its stack frame	Apply	This would require the learner to recall the annotations	CO 12
6	Describe the Coffman's conditions that lead to a deadlock.	Apply	This would require the learner to recall the Coffman's conditions	CO 12
7	A system contains three programs and each requires three tape units for its operation. Explain the minimum number of tape units which the system must have such that deadlocks never arise is	Apply	This would require the learner to recall the	CO 12
8	A system has 6 identical resources and N processes competing for them. Each process can request at most 2 resources. Explain which one of the following values of N could lead to a deadlock.	Apply	This would require the learner to recall the deadlocks	CO 12
9	Define in detail the technique of deadlock avoidance	Understand	This would require the learner to recall the deadlock	CO 12
10	Explain briefly about purpose of the banker's algorithm.	Apply	This would require the learner to recall the Banker's algorithm	CO 12

PART - B (LONG ANSWER QUESTIONS)				
1	What is the deadlock? Explain the necessary conditions for its occurrence	Understand	This would require the learner to recall the Deadlock	CO 11
2	Explain briefly resource allocation graph with examples	Understand	This would require the learner to recall the research algorithm graph	CO 12
3	Explain the methods for deadlock prevention	Understand	This would require the learner to recall the prevention of deadlock	CO 11
4	Explain the resource allocation graph	Understand	This would require the learner to recall the research algorithm	CO 11
5	Differentiate the deadlock handling methods	Understand	This would require the learner to recall the Deadlock handling methods	CO 12
6	Explain Banker's algorithm for deadlock avoidance with an example	Understand	This would require the learner to recall the banker's algorithm	CO 12
7	Discuss the various issues that need to be considered through the process of revocation of access rights	Understand	This would require the learner to recall the process of revocation and access rights	CO 12
8	State and explain the methods involved in recovery from deadlocks.	Understand	This would require the learner to recall the recovery from deadlock	CO 11
9	Describe resource-allocation graph. Explain how resource graph can be used for detecting deadlocks	Understand	This would require the learner to recall the resource allocation graph	CO 11
10	Describe the terms. a) Race condition b) Atomic transaction c) Critical section d) Mutual exclusion	Understand	This would require the learner to recall the race condition and atomic transaction and Critical section and mutual exclusion	CO 12
11	Describe how the access matrix facility and role-based access control facility are similar. How do they differ?	Remember	This would require the learner to recall the role based access control	CO 11
12	Explain why a capability based system such as Hydra provides greater flexibility than the ring-protection scheme in enforcing protection policies.	Understand	This would require the learner to recall the protections	CO 12

13	Define Goals of protection	Understand	This would require the learner to recall the goals of protection	CO 11
14	Define Principles of protection.	Understand	This would require the learner to recall the principles of protection	CO 11
15	Discuss about domain of protection	Understand	This would require the learner to recall the domain of protection	CO 11
16	Why do you need to provide protection to the system?	Understand	This would require the learner to recall the Provide protection to the system	CO 11
17	Discuss the access matrix implementation techniques.	Understand	This would require the learner to recall the access matrix implementation techniques	CO 11
18	Compare the various access matrix implementation techniques	Understand	This would require the learner to recall the axis Matrix implementation techniques	CO 12
19	Discuss deadlock detection method in detail.	Understand	This would require the learner to recall the deadlock detection	CO 11
20	Explain various schemes to implement revocation for capabilities	Understand	This would require the learner to recall the implement revocation per capability	CO 12
PART-C SHORT ANSWER QUESTIONS				
1	Define Deadlock	Remember	This would require the learner to recall theDeadlock	CO 11
2	Define resource.	Remember	This would require the learner to recall the resources	CO 11
3	List some resources that a process might need for its execution	Understand	This would require the learner to recall the Research and its execution	CO 11
4	Explain safe state	Remember	This would require the learner to recall the safe ve state	CO 11
5	Explain unsafe state	Remember	This would require the learner to recall the unsafe state	CO 11

6	Define the purpose of banker's algorithm	Understand	This would require the learner to recall the banker's algorithm	CO 11
7	Describe the techniques for recovery from deadlock	Remember	This would require the learner to recall the recovery of deadlock	CO 11
8	List the goals of protection	Remember	This would require the learner to recall the goals for protection	CO 11
9	Describe any one language-based protection schemes	Remember	This would require the learner to recall the language basic protection	CO 11
10	State principle of least privilege.	Understand	This would require the learner to recall the least privilege	CO 11
11	Describe role-based access control.	Remember	This would require the learner to recall the Role based access control	CO 12
12	List the schemes that implement revocation of capabilities	Remember	This would require the learner to recall the implement revocation of capability	CO 12
13	Explain the sequence in which a process may utilize the resources in normal mode of operation	Remember	This would require the learner to recall the Resources	CO 11
14	Define the terms : a) object b) domain c) access right.	Understand	This would require the learner to recall the terms in deadlock	CO 12
15	Write the main differences between capability lists and access lists	Understand	This would require the learner to recall the differences between captopril ATI list and access list	CO 11
16	Distinguish between deadlock avoidance and prevention strategies.	Remember	This would require the learner to recall the Prevention state strategies of deadlock	CO 11
17	Why is deadlock state more critical than starvation?	Remember	This would require the learner to recall the Starvation and deadlock	CO 11
18	What are two options for breaking deadlock?	Remember	This would require the learner to recall the Breaking deadlock	CO 11

19	What is meant by Starvation	Remember	This would require the learner to recall the starvation	CO 11
20	Write the format of an access matrix	Remember	This would require the learner to recall the format of an access matrix	CO 11

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