Unit-I

	Computer Science and Engineering		
	23CS401 – Operating System		
	First		
Q.No	Questions	Cos	Bloom's Level
1	What are the basic components of the computer system?	CO1	K1
2	What is an operating system?	CO1	K1
3	Describe the different views of OS.	CO1	K1
4	What is the role of device controller?	CO1	K1
5	What is the role of device driver?	CO1	K1
6	Define: Interrupt-specific handler.	CO1	K1
7	What are maskable and non maskable interrupts?	CO1	K1
8	What is the Purpose of a vectored interrupt mechanism?	CO1	K1
9	Describe the concept of interrupt chaining,	CO1	K1
10	Illustrate the need of interrupt priority levels.	CO1	K2
11	What is bootstrap program?	CO1	K1
12	What are the types of Memory? Give example.	CO1	K1
13	Describe the functionality of direct memory access (DMA).	CO1	K1
14	Draw the Symmetric multiprocessing architecture.	CO1	K1
15	Describe: Loosely Coupled Systems	CO1	K1
16	What are services provided by operating system?	CO1	K1
17	What are the different User Operating System Interfaces?	CO1	K1
18	What do you mean by system calls?	CO1	K1
19	What is API?	CO1	K1
20	What are the categories of system calls?	CO1	K1
21	What is system program?	CO1	K1
22	What are categories of system programs?	CO1	K1
23	List the different structures of Operating System?	CO1	K1
24	Define microkernel.	CO1	K1
25	Define process.	CO2	K1
26	What are the states in a process?	CO2	K1
27	What are the types of CPU schedulers?	CO2	K1
28	What is the concept of Context Switch?	CO2	K1
29	What is cascading termination?	CO2	K1
30	What is zombie process?	CO2	K1
31	What are the Benefits of Cooperating Processes?	CO2	K1

32	Differentiate the different communication models of IPC.	CO2	K2
33	What are the different types of Buffering in IPC?	CO2	K1
34	What is thread?	CO2	K1
35	What are the benefits of multithreaded programming?	CO2	K1
PART B			
1	Discuss in details the components and functionalities of Computer System Organization.	CO1	K2
2	Explain in details about Computer-System Architecture.	CO1	K2
3	Explain in detail the types of system calls.	CO1	K2
4	Explain in detail about the operating system Structure	CO1	K2
5	Outline the basic concepts of process.	CO2	K2
6	Discuss in detail about different scheduling mechanisms involved in process.	CO2	K2
7	Describe in detail the concept of process creation and process termination.	CO2	K2
8	Outline IPC in Shared-Memory Systems and Message Passing Systems	CO2	K2
9	Illustrate the concepts of multithread models.	CO2	K2

UNIT-II

Q.No	Questions	Cos	Bloom's Level
1	What are the circumstances for CPU scheduling decisions?	CO2	K1
2	What is preemptive and nonpreemptive scheduling?	CO2	K1
3	Define dispatcher and list it functionalities.	CO2	K1
4	Illustrate the Criteria to compare CPU-scheduling algorithms	CO2	K2
5	What is the concept of FCFS and SJF scheduling?	CO2	K1
6	What is the concept of Priority and Round Robin scheduling?	CO2	K1
7	Describe about SRTF.	CO2	K1
8	Describe the issue in priority scheduling algorithms and suggest a way to solve it.	CO2	K2
9	Interpret the relationship between Turnaround time and the size of the time quantum in RR scheduling.	CO2	K2
10	Define: Multilevel Queue Scheduling.	CO2	K1
11	List the queues in multilevel queue scheduling algorithm with respect to order of priority.	CO2	K1
11	Define: Multilevel Feedback Queue Scheduling.	CO2	K1
12	List the parameters defines the multilevel feedback queue scheduler.	CO2	K1
13	What is race condition?	CO2	K1

14	What are the requirements to provide solution to the critical-section problem?	CO2	K1
15	What is meant by spin locks?	CO2	K1
16	What are the types of semaphore?	CO2	K1
17	What is the use of monitors?	CO2	K1
18	Define: Deadlock.	CO2	K1
19	Illustrate the components of resource allocation graph.	CO2	K1
20	Describe the Methods for Handling Deadlocks.	CO2	K1
21	What is safe sequence?	CO2	K1
	PART B		
1.	Explain in detail all scheduling algorithm with example.	CO2	K2
2.	Assume the following processes arrive for execution at the time t=0 and also mentioned with the length of the CPU-burst time given in milli seconds. JOB (ms) BURST TIME (ms) PRIORITY P1 14 2 P2 3 2 P3 3 4 P4 6 1 P5 4 3 I. Give a Gantt chart illustrating the execution of these processes using FCFS, SJF, Round Robin(quantum=2) and Priority II. Calculate the average waiting time and average turn around time for each of the above scheduling algorithm.	CO2	K3
3.	Assume the following processes arrive for execution at the time indicated and also mention with the length of the CPU-burst time given in milli seconds. JOB BURST TIME PRIORITY ARRIVAL TIME P1 9 2 0 P2 2 1 1 P3 3 4 1 P4 1 1 2 1. Give a Gantt chart illustrating the execution of these processes using FCFS, SJF, SRTF, Round Robin(quantum=3) and Priority (Preemptive and Non Preemptive) 2. Calculate the average waiting time and average turnaround time for each of the above scheduling algorithm.	CO2	K3
4.	Discuss about the critical section problem in process synchronization.	CO2	K2
5.	Describe the Hardware Support solutions for process Synchronization	CO2	K2
6.	Describe Mutex Locks and explain how it provides	CO2	K2

	solution for critical section problem.		
7.	Explain in detail the usage and implementation of Semaphores	CO2	K2
8.	Explain in details about Monitor	CO2	K2
9.	Discuss in detail the Classical problems of synchronization	CO2	K2
10.	Illustrate the necessary condition for deadlock and describe deadlock with the help of resource allocation graph.	CO2	K2
11.	Discuss the deadlock prevention methods.	CO2	K2
12.	Discuss the approaches for deadlock avoidance.	CO2	K2
13.	Consider the following snapshot of a system: Process Allocation Max Available A B C D A B C D A B C D P0 1 0 1 3 2 0 1 4 2 7 3 0 P1 2 0 0 0 3 7 5 0 P2 1 2 5 6 2 3 6 7 P3 0 4 3 2 0 6 5 4 P4 0 5 1 4 0 6 2 4 Answer the following questions applying the banker's algorithm. a. What is the content of the matrix *Need*? Is the system in a safe state? b. If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?	CO2	K2
14.	Consider the following snapshot of a system with resource type A has 7 instances, resource type B has 6 instances and resource type C has 5 instances. Process Allocation Max A B C A B C P0 1 1 3 7 5 4 P1 3 1 0 5 2 2 P2 2 0 0 4 0 3 P3 1 1 0 4 1 2 P4 0 0 1 4 5 2 Answer the following questions applying the banker's algorithm: a. What is the content of the matrix *Need*? Is the system in a safe state? b. If a request from process P1 arrives for (0, 1, 0), can the request be granted immediately?	CO2	K3
15.	Describe the mechanisms of Deadlock detection and Recovery from deadlock.	CO2	K2

UNIT III

Q.No	Questions	COs	Bloom's level
1	What are the steps in which address binding is carried out?	CO3	K1
2	Define: Logical address and physical address.	CO3	K1
3	What is the role of relocation-register?	CO3	K1
4	What is the concept of external fragmentation?	CO3	K1
5	What is the concept of internal fragmentation?	CO3	K1
6	What do you mean by best fit?	CO3	K1
7	What do you mean by first fit?	CO3	K1
8	What do you mean by worst fit?	CO3	K1
9	What is compaction?	CO3	K1
10	Differentiate Paging and Segmentation.	CO3	K2
11	Define: Translation Look-aside Buffer (TLB).	CO3	K1
12	Define: TLB Hit and TLB Miss	CO3	K1
13	How protection is accomplished in paging?	CO3	K1
14	What is virtual memory?	CO3	K1
15	What is Demand paging?	CO3	K1
16	Describe the concept of copy on write.	CO3	K1
17	What is Belady's anomaly?	CO3	K1
18	What is dirty bit/modify bit?	CO3	K1
19	What is thrashing?	CO3	K1
20	What is working set model?	CO3	K1
	PART B		
1	Explain about the contiguous memory allocation.	CO3	K2
2	Illustrate the concepts of Segmentation.	CO3	K2
3	Outline the concepts of paging with suitable example.	CO3	K2
4	Discuss in detail the different structures of page table.	CO3	K2
5	Explain the concept of demand paging in Virtual Memory	CO3	K2
6	Outline the concept of page replacement and explain the replacement algorithms in brief.	CO3	K2
7	Consider the following page reference string 5, 0, 1, 5, 0, 3, 0, 1, 2, 3, 1, 3, 2, 1, 2, 0, 1, 7, 0, 1,4,1 How many page faults would occur for the following replacement algorithms, assuming three frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each. • FIFO replacement • Optimal replacement • LRU replacement	CO3	K3

8	Consider the following page reference string 7, 2, 1, 5, 2, 3, 0, 1, 7, 0, 1, 0, 2, 5, 5, 0, 1, 6, 0, 6,0,5,2,4,0,2 How many page faults would occur for the following replacement algorithms, assuming four frames? Remember all frames are initially empty, so your first unique pages will all cost one fault each. • FIFO replacement • Optimal replacement • LRU replacement	CO3	K3
9	Illustrate the cause of thrashing and explain the mechanisms to prevent thrashing.	CO3	K2

UNIT-IV

Q.No	Questions	COs	Bloom's level
1	Define seek time and latency time	CO4	K1
2	Suppose that the disk rotates at 7200 rpm. What is the average rotational latency of the disk drive? .	CO4	K2
3	Define rotational latency and disk bandwidth	CO4	K1
4	A disk has 2310 cylinders, 16 tracks and 63 sectors. The disk spins at 7200 rpm. Seek time between adjacent tracks is 1ms. How long does it take to read the entire disk?	CO4	K2
5	List the types of disk scheduling algorithms.	CO4	K1
6	What is low-level formatting?	CO4	K1
7	What is the use of boot block?	CO4	K1
8	Define: Sector sparing.	CO4	K1
9	Define: Sector slipping	CO4	K1
10	What is daisy chain?	CO4	K1
11	State the registers control I/O devices.	CO4	K1
12	Describe the concept of polling.	CO4	K1
13	What is the concept of interrupt chaining?	CO4	K1
14	Infer how DMA increases system concurrency?	CO4	K2
15	What is the role of device-status table?	CO4	K1
16	Define: Buffering.	CO4	K1
17	Describe the concept of double buffering.	CO4	K1
18	Define: Caching.	CO4	K1
19	Define: Spooling.	CO4	K1
20	Describe file and list its types.	CO4	K1
21	What are the different attributes of file?	CO4	K1
22	What is directory?	CO4	K1

23	What are the operations that can be performed on a directory?	CO4	K1
24	Define: Mount point.	CO4	K1
25	What are the different types of access rights given to a file?	CO4	K1
26	Describe the challenges associated with file sharing.	CO4	K1
	PART B		
1	Discuss the Disk scheduling algorithms with example.	CO4	K2
2	Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving a request at cylinder 2,150, and the previous request was at cylinder 1,805. The queue of pending requests, in FIFO order, is: 2,069, 1,212, 2,296, 2,800, 544, 1,618, 356, 1,523, 4,965, 3681 Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms? a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN	CO4	K3
3	On a disk with 1000 cylinders, numbers 0 to 999, compute the number of tracks the disk arm must move to satisfy the entire request in the disk queue. Assume the last received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks. 123,874,692,475,105 and 376. Find the seek length for the following scheduling algorithms. a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN	CO4	K3
4	Outline the concept of memory mapped I/O and polling	CO4	K2
5	Explain in detail the concept of interrupts in I/O (8) Explain in details the concept of DMA (7)	CO4	K2
6	Explain in detail the various services provides by Kernel with respect to I/O.	CO4	K2
7	Explain about different attributes of file (7) Outline the different operations that can be performed on a file (8)	CO4	K2

8	Discuss the different types of file. (7) Outline the different file access methods. (8)	CO4	K2
9	Explain in detail the schemes for defining the logical structure of a directory.	CO4	K2
10	Explain about File-System Structure (7) Discuss the methods of directory implementation. (8)	CO4	K2
11	Explain the various Allocation Methods in file system.	CO4	K2
12	Discuss in detail the Free-Space Management techniques of file system.	CO4	K2

UNIT-V

Q.No	Questions	COs	Bloom's Level
1	What is virtualization?	CO5	K1
2	State the virtualization requirements.	CO5	K1
3	Define Paravirtualization	CO5	K1
4	State the purpose of hypervisor	CO5	K1
5	What is emulation?	CO5	K1
6	What is VCPU?	CO5	K1
7	State about Binary translation.	CO5	K1
8	What is nested page table?	CO5	K1
9	What is virtual machine sprawl?	CO5	K1
10	Describe control partition.	CO5	K1
11	State the role of containers in Oracle Solaris.	CO5	K1
12	Describe the functionality of Pseudo device driver.	CO5	K1
13	What is NAT address?	CO5	K1
14	Which layer of iOS contains fundamental system services for apps? What are the components of this layer?	CO6	K1
15	What is iOS SDK?	CO6	K1
16	What is the media layer in iOS?	CO6	K1
17	Draw the iOS architecture.	CO6	K1
18	What is the functionality of application frameworks layer of iOS?	CO6	K1
19	What is Android?	CO6	K1
20	Draw the Android architecture.	CO6	K1
PART B			
1	Explain the building blocks of Virtual Machine	CO5	K2
2	Explain the types of virtual Machine and its implementation techniques.	CO5	K2
3	Outline how OS handles I/O, Storage management and live migration in virtual environment.	CO5	K2
4	Explain about the Android OS	CO6	K2
5	Explain about the iOS Operating System.	CO6	K2