PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY			
BRANCH:	CSE/IT	REGULATION:	PVP23
COURSE:	B.TECH	COURSE NAME:	OPERATING SYSTEMS
COURSE CODE:	23CS3401/ 23IT3401	YEAR & SEMESTER:	II YEAR & II SEM
QUESTION BANK			

UNIT I

Short Answer Questions (2 Marks Each)

S. NO.	QUESTIONS	CO	Bloom's Level	MARKS
1	Define operating system.	CO1	L2	2M
2	Outline the operating system functions.	CO1	L2	2M
3	Explain the two modes of operating system operations.	CO1	L2	2M
4	Explain any two computing environments.	CO1	L2	2M
5	List the examples of open source operating systems.	CO1	L2	2M
6	Describe the operating system services.	CO1	L2	2M
7	Compare the command-line interface (CLI) with graphical user interfaces (GUI).	CO1	L2	2M
8	Define system call.	CO1	L2	2M
9	Summarize the file management system calls.	CO1	L2	2M
10	Outline the design goals of operating system.	CO1	L2	2M

Long Answer Questions (10 Marks Each)

S. NO.	QUESTION	CO	LEVEL	MARKS
1	Explain the difference between the user view and system view of an operating system.	CO1	L2	10 M
2	Outline different types of operating system interfaces.	CO1	L2	10 M
3	Summarize the operating system operations.	CO1	L2	10 M
4	Explain how an operating system handles protection and security.	CO1	L2	10 M
5	Explain various operating system functions.	CO1	L2	10 M
6	Summarize the operating system services.	CO1	L2	10 M
7	Outline different types of user and operating system interfaces.	CO1	L2	10 M
8	What is a system call? Explain exactly how a system calls switches a process to kernel mode during its execution and how is it switched back to user mode on return from a system call.	CO1	L2	10 M
9	Summarize about the system programs.	CO1	L2	10 M
10	Explain the purpose of all types of system calls and discuss the calls related to Process Control, device management in detail.	CO1	L2	10 M

UNIT II

Short Answer Questions (2 Marks Each)

S. NO.	QUESTIONS	CO	Bloom's Level	MARKS
1	Explain what is a process.	CO1	L2	2M
2	Compare program and process.	CO1	L2	2M
3	Explain about the process states.	CO1	L2	2M
4	Summarize the usage of PCB (Process Control Block).	CO1	L2	2M
5	Explain the functionality of dispatcher.	CO1	L2	2M
6	Explain starvation and aging	CO1	L2	2M
7	Differentiate between independent and cooperative process.	CO1	L2	2M
8	Differentiate between a thread and a process.	CO1	L2	2M
9	Outline the advantages of inter-process communication.	CO1	L2	2M
10	Outline the scheduling criteria.	CO1	L2	2M

Long Answer Questions (10 Marks Each)

S. NO	QUESTION	CO	LEVEL	MARKS
1	A) Explain about the process. Show various process states. B) Explain about Process Control Block.	CO2 CO2	L2 L2	5 M 5 M
2	A) Outline Process Scheduling and Process Scheduling Queues. B) Explain briefly about different types of Schedulers.	CO2 CO2	L2 L2	5 M 5 M
3	A) Explain about Context switching. B) Explain the operations that can be performed on a process.	CO2 CO2	L2 L2	5 M 5 M
4	A) Summarize how Inter Process Communication takes place. B) Explain about Message Passing Systems.	CO2 CO2	L2 L2	5 M 5 M
5	A) Outline different Multithreading Models. B) Explain different Threading Issues in Operating Systems.	CO2 CO2	L2 L2	5 M 5 M
6	A) Consider the following set of processes arrives at time 0 with the length of CPU burst given in milliseconds for the processes P1, P2, P3. Process | Burst Time P1 | 24 P2 | 3 P3 | 3 Identify the waiting time, average waiting time of the processes if the processes arrive in order P1, P2, P3 and P2, P3, P1 using FCFS scheduling. B) Consider the following set of processes, with the length of the CPU burst given in milliseconds. Process | Arrival Time | Burst Time P1 | 0.0 | 6	CO2 CO4	L3 L4	5 M 5 M

	P2 0.0 8 P3 0.0 7 P4 0.0 3 By using SJF Scheduling, inspect the weighting time and average waiting time.			
7	A) Consider the following set of processes, with the length of the CPU burst given in milliseconds. Process / Arrival Time / Burst Time P1 0 8 P2 1 4 P3 2 9 P4 3 5 Experiment with Non-Preemptive (or) SRTF scheduling to find the waiting time and average waiting time of the processes. B) Consider the following arrival time and burst time for processes P1, P2, P3, P4. Process / Arrival Time / Burst Time P1 0 7 P2 2 4 P3 4 1 P4 5 4 Analyze average waiting time of processes by considering the Non-Preemptive and Preemptive Scheduling Algorithm.	CO2 CO4	L3 L4	5 M 5 M
8	A) Consider the following arrival time and burst time for processes P1, P2, P3, P4. Process / Arrival Time / Burst Time P1 0 4 P2 1 3 P3 2 1 P4 3 2 P5 4 6 Identify the Total Waiting Time, Average Waiting Time and Average Turnaround Time of processes using SJF. B) Consider the following burst time and priority for different processes, find the waiting time and average waiting time of processes using Priority Scheduling. Process / Arrival Time / Burst Time P1 10 3 P2 1 1 P3 2 4 P4 1 5 P5 5 2	CO2 CO2	L3 L3	5 M 5 M
9	A) Consider the processes and burst time with time quantum of 4 milliseconds. Identify the waiting time and average waiting time of different processes using Round Robin Scheduling. Process / Burst Time P1 24 P2 3	CO2	L3	5 M

	P3 3 B) Consider the processes and burst time with time quantum of 20 milliseconds. Identify the waiting time and average waiting time of different processes using Round Robin Scheduling. Process Burst Time P1 53 P2 8 P3 68 P4 24	CO2	L3	5 M
10	A) Consider the processes and burst time with time quantum of 4 milliseconds. Identify the waiting time and average waiting time of different processes using Round Robin Scheduling. Process Burst Time P1 20 P2 12 P3 8 P4 16 P5 4 B) Demonstrate multiple processor scheduling.	CO2 CO2	L3 L2	5 M 5 M

UNIT III

Short Answer Questions (2 Marks Each)

S. NO.	QUESTIONS	CO	Bloom's Level	MARKS
1	Explain Race condition.	CO1	L2	2M
2	Describe critical section problem.	CO1	L2	2M
3	Explain Mutual Exclusion.	CO1	L2	2M
4	Demonstrate operations that can be performed on semaphore.	CO1	L2	2M
5	Explain Dead lock.	CO1	L2	2M
6	Outline the necessary conditions for deadlock occurrence.	CO1	L2	2M
7	Outline the necessary conditions for deadlock prevention.	CO1	L2	2M
8	Explain safe state.	CO1	L2	2M
9	Describe methods for Handling Deadlocks.	CO1	L2	2M
10	Explain the usage of Monitor for synchronization construct.	CO1	L2	2M

Long Answer Questions (10 Marks Each)

S. NO	QUESTION	CO	LEVEL	MARKS
1	A) Outline critical section problem. B) Explain Peterson solution to the critical section problem.	CO3 CO3	L2 L2	5 M 5 M
2	A) Explain about Mutex Locks. B) Illustrate about Semaphores and their usage.	CO3 CO3	L2 L2	5 M 5 M

<table>
<tr><td>3</td><td>Make use of semaphores for solving
A) Bounded buffer problem.
B) Reader-Writer classical synchronization problem.</td><td>CO3</td><td>L3</td><td>10 M</td></tr>
<tr><td>4</td><td>A) Develop a solution for dining philosopher's problem using semaphores.
B) Utilize Monitors for solving process synchronization problem.</td><td>CO3
CO3</td><td>L3
L3</td><td>5 M
5 M</td></tr>
<tr><td>5</td><td>Explain about deadlock? Explain about the deadlock characterization in detail?</td><td>CO3</td><td>L2</td><td>10 M</td></tr>
<tr><td>6</td><td>A) Explain the different methods for handling deadlocks.
B) Summarize briefly about the prevention the occurrence of deadlocks.</td><td>CO3
CO3</td><td>L2
L2</td><td>5M
5M</td></tr>
<tr><td>7</td><td>A) Explain about deadlock avoidance.
B) Explain in detail about Banker's algorithm.</td><td>CO3
CO3</td><td>L2
L2</td><td>5 M
5 M</td></tr>
<tr><td>8</td><td>Consider the following snapshot of a system:
<table>
<tr><th>Process</th><th>Allocation</th><th>Max.</th><th>Available</th></tr>
<tr><td>P_0</td><td>0012</td><td>0012</td><td>1520</td></tr>
<tr><td>P_1</td><td>1000</td><td>1750</td><td></td></tr>
<tr><td>P_2</td><td>1354</td><td>2356</td><td></td></tr>
<tr><td>P_3</td><td>0632</td><td>0652</td><td></td></tr>
<tr><td>P_4</td><td>0014</td><td>0656</td><td></td></tr>
</table>
Answer the following questions by applying the Banker's Algorithm:
a) What is the content of the matrix Need?
b) Is the system in a safe state?
c) If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?</td><td>CO3</td><td>L3</td><td>10 M</td></tr>
<tr><td>9</td><td>Consider five processes P_0 , P_1 , P_2 , P_3 , P_4 with three resource types: A, B, C with 10, 5, 7 instances. A snapshot of the system taken at time T_0 is shown below
<table>
<tr><th rowspan="2">Process</th><th>Allocation</th><th>Max</th><th>Available</th></tr>
<tr><th>A B C</th><th>A B C</th><th>A B C</th></tr>
<tr><td>P_0</td><td>0 1 0</td><td>7 5 3</td><td rowspan="5">3 3 2</td></tr>
<tr><td>P_1</td><td>2 0 0</td><td>3 2 2</td></tr>
<tr><td>P_2</td><td>3 0 2</td><td>9 0 2</td></tr>
<tr><td>P_3</td><td>2 1 1</td><td>2 2 2</td></tr>
<tr><td>P_4</td><td>0 0 2</td><td>4 3 3</td></tr>
</table>
By considering Bankers Algorithm, analyze the following:
a) What will be the content of the Need matrix?
b) Is the system in a safe state? If Yes, then what is the safe sequence?
c) What will happen if process P1 requests one additional instance of resource type A and two instances of resource type C?</td><td>CO4</td><td>L4</td><td>10 M</td></tr>
<tr><td>10</td><td>A) Summarize about deadlock detection?
B) Explain how to recover from deadlocks?</td><td>CO3
CO3</td><td>L2
L2</td><td>5 M
5 M</td></tr>
</table>

UNIT IV

Short Answer Questions (2 Marks Each)

S. NO.	QUESTIONS	CO	Bloom's Level	MARKS
1	Explain virtual address.	CO1	L2	2M
2	Outline contiguous memory allocation?	CO1	L2	2M
3	Explain hole?	CO1	L2	2M
4	Explain External fragmentation?	CO1	L2	2M
5	Explain Internal fragmentation?	CO1	L2	2M
6	Describe paging?	CO1	L2	2M
7	Explain Compaction?	CO1	L2	2M
8	Summarize the steps in page fault service?	CO1	L2	2M
9	Describe Belady's anomaly?	CO1	L2	2M
10	Explain thrashing?	CO1	L2	2M

Long Answer Questions (10 Marks Each)

S. NO.	QUESTION	CO	LEVEL	MARKS
1	A) Explain in detail about swapping technique and its purpose? B) Explain about contiguous memory allocation?	CO2 CO2	L2 L2	5 M 5 M
2	A) Summarize about memory fragmentation? B) Explain about internal fragmentation and external fragmentation?	CO2 CO2	L2 L2	5 M 5 M
3	Explain about Paging.	CO2	L2	10 M
4	A) Explain about segmentation hardware? B) Outline various page table structures.	CO2 CO2	L2 L2	5 M 5 M
5	A) Summarize about virtual memory? B) Explain about demand paging?	CO2 CO2	L2 L2	5 M 5 M
6	A) Explain the steps in handling page fault? B) Explain about page replacement?	CO2 CO2	L2 L2	5 M 5 M
7	Identify the number of page faults occurred When FIFO, LRU page replacement algorithms applied on the following memory string 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1 The number of frames available are 4.	CO2	L3	10 M
8	Given five memory partitions of 100Kb, 500Kb, 200Kb, 300Kb, 600Kb (in order), Choose the first-fit, best-fit, and worst-fit algorithms place processes of 212 Kb, 417 Kb, 112 Kb, and 426 Kb (in order), Examine which algorithm makes the most efficient use of memory?	CO4	L4	10 M
9	Consider the page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. If the page frame size is 3, Analyze the number of page faults by applying the following page	CO4	L4	10 M

	replacement algorithms. **a)** FIFO Page Replacement **b)** Optimal Page Replacement **c)** LRU Page Replacement			
10	Consider the order of request is 82, 170, 43, 140, 24, 16, 190. The current position of read/write head is 50. Identify the total seek time for the following a) FCFS Disk Scheduling b) SSTF Disk Scheduling c) SCAN Disk Scheduling d) CSCAN Disk Scheduling e) LOOK Disk Scheduling	CO2	L3	10 M

UNIT V

Short Answer Questions (2 Marks Each)

S. NO.	QUESTIONS	CO	Bloom's Level	MARKS
1	Explain about file.	CO1	L2	2M
2	Explain about the different types of files attributes.	CO1	L2	2M
3	Outline the different access methods of a file.	CO1	L2	2M
4	Explain file allocation table (FAT).	CO1	L2	2M
5	Explain various common file types.	CO1	L2	2M
6	Explain random access.	CO1	L2	2M
7	Explain the advantages of tree structured directory.	CO1	L2	2M
8	Outline the ways to implement directory structure.	CO1	L2	2M
9	Explain about mounting.	CO1	L2	2M
10	Outline the types of files sharing in remote file systems.	CO1	L2	2M

Long Answer Questions (10 Marks Each)

S. NO	QUESTION	CO	LEVEL	MARKS
1	Explain about file, file attributes, file operations, file types and file structure.	CO1	L2	10 M
2	Explain different file access methods.	CO1	L2	10 M
3	Illustrate file system mounting.	CO1	L2	10 M
4	Summarize various schemes for defining logical structure of directory.	CO1 CO1	L2 L2	10 M 10 M
5	Distinguish contiguous and linked file allocation methods.	CO1	L2	10 M
6	Dissect various file allocation methods and analyze the performance of each method for allocating disk space.	CO4	L4	10 M
7	Summarize free space management.	CO1	L2	10 M
8	Explain about the following A) Domain of protection B) Access Matrix	CO1	L2	10 M

9	Demonstrate file sharing.	CO1	L2	10 M
10	Explain file system structure.	CO1	L2	10 M

Course Coordinator **HOD**