Unit 1

2 Marks:

1. What is system call? Mention different types of system call.
2. Define thread. State the major advantage of thread.
3. Define context switch.
4. What is the need for an operating system? Give example of a few commercially available operating systems
5. Define term CPU scheduling and throughput.
6. What is multiprogramming?
7. List the services of an operating system.
8. Mention the types of Inter process communication.
9. Define operating system list with its goals.
10. Mention any two applications real time systems.
11. What do you mean by process?
12. Define throughput and response time.
13. Define schedulers. List its types.

5 Marks:

1. What are the components of process control block? Explain
2. List categories of OS services and explain the services in detail.
3. List out advantages and disadvantages of real time systems.
4. What are process states? Explain the state transition diagram
5. Explain the activities of an operating system in connection with process management and file management.
6. What is a real time system? Explain.
7. Explain multiprogramming system with its features.
8. Explain batch operating system with advantages and disadvantages.
9. Explain process control block with neat diagram.
10. Explain monolithic and Microkernel operating system.
11. Explain system call.

Unit 2

2 Marks

1. Define thread. State the major advantage of thread.
2. Define multithreading
3. Define CPU scheduling.
4. Define preemptive & non preemptive CPU scheduling
5. Differentiate between user level & kernel level thread.

5 Marks

1. Define and explain various CPU scheduling criteria that can be used in selecting a scheduling algorithm.
2. Define thread. Explain the types of thread in detail
3. Explain the benefits of thread.
4. Write a note on threading issues
5. Define CPU utilization, Throughput, waiting time, Turnaround time & response time
6. Explain CPU scheduling (any one) algorithm in detail with example.
7. Write a note on multiprocessor / multiple processor scheduling
8. Write a note on real time scheduling
9. Foe the processes listed below, draw a Gantt chart using pre-emptive and non – preemptive SJF and also calculate average waiting time & average turnaround time.

Processes	Arrival Time	Burst Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

10 marks:

1. Assume the following process arrive for execution at the time indicated and also the length of CPU- burst time and arrival time is given in milliseconds.

Process	Burst time (ms)	Priority	Arrival Time(ms)
P1	8	4	0
P2	9	1	0
P3	4	2	1
P4	3	3	2

a) Give a Gantt chart illustration the execution of these processes using SJF (preemptive) and priority (non preemptive), lower number indicates high priority.

b) Calculate the average waiting time for each of the above scheduling algorithm.

2. Explain multithreading model in operating system with neat diagram

3. Consider the following set of processes, with the length of CPU burst time in milliseconds.

Process	Burst Time
P1	3
P2	1
P3	3
P4	4
P5	2

i) Draw Gantt illustrating the execution of these processes using FCFS and round robin (quantum time = 1 msec) scheduling methods.

ii) Calculate the average waiting time and average turnaround time for both of these scheduling methods.

4. Consider the following set of processes, with the length of CPU burst time in milliseconds.

Process	Burst Time
P1	8
P2	4
P3	9
P4	5
P5	1

i) Draw Gantt charts to show execution using FCFS and SJF scheduling.

ii) Calculate average waiting time for each scheduling algorithm

iii) Calculate average turnaround time for each scheduling algorithm.

5. Consider the following set of process with CPU burst time given in milliseconds.

Process	Burst Time
P1	8
P2	4
P3	9
P4	5

a) Draw a Gantt chart for FCFS and round robin scheduling

b) Calculate average waiting time and average turnaround time for FCFS and round robin scheduling

6. Consider the following set of processes with CPU burst time given in milliseconds.

Process	Burst Time
P1	10 ms
P2	1 ms
P3	2 ms
P4	1 ms
P5	5 ms

Processes are arrived in p1,p2,p3,p4,p5 order of all at time 0 (zero)

a) Draw Gantt charts to show execution using SJF and Round Robin (Quantum time = 1ms) scheduling.

b) Calculate average waiting time for SJF and round robin scheduling

c) Calculate average turnaround time for SJF and Round robin scheduling

7. Consider the following set of processes with CPU burst time and arrival time given in milliseconds.

Process	Arrival Time	Burst Time
P1	0	8 ms
P2	1	4 ms
P3	2	9 ms
P4	3	5 ms

a) Draw the Gantt chart illustrating the execution of these processes using b FCFS and Round – Robin scheduling (Quantum Time 1 ms).

b) Calculate the average waiting time for FCFS , RR scheduling

C) Calculate average turnaround time for FCFS and RR scheduling

8. The following table list out the sequence of processes entering the ready queue with their corresponding CPU burst time given in milliseconds.

Process	CPU burst time in milliseconds
P1	20
P2	4
P3	3

a) Draw Gantt chart illustrating execution of these processes using RR scheduling

b) Calculate average waiting time

9. assume the following processes arrives for execution at the time indicated and also the length of CPU- burst time and arrival time is given in milliseconds.

Process	Burst time (ms)	Priority	Arrival time
P1	8	4	0
P2	9	1	0
P3	4	2	1
P4	3	3	2

a) Give a Gantt chart illustrating the execution of these processes using SJF (preemptive) and priority (non preemptive), lower number indicates high priority.

Unit 3

2 Marks:

1. Give the necessary condition for deadlock to occur.
2. Define the term backup and recovery.
3. What are semaphores? Mention its types.
4. Differentiate between counting and binary semaphores.
5. What is critical section problem?
6. What is deadlock?
7. What are the methods for handling deadlock?
8. What is a binary semaphore? Mention its types
9. Mention the two instructions used for the implementation of mutual exclusion in critical section.
10. Mention the solutions of critical section problem.
11. Define race condition.

5 Marks:

1. Explain dining philosopher's problem of synchronization
2. What are critical regions? Explain with general syntax.
3. Define semaphores. Explain producer consumer problem of synchronization.
4. Explain necessary condition for deadlock.
5. Explain the method of deadlock prevention.
6. Explain the critical section problem
7. Explain necessary condition for deadlock situation.
8. Explain necessary characteristics of deadlocks
9. What is deadlock?
10. Explain monitors.

Unit 4

2 Marks:

1. Define swapping
2. Define fragmentation
3. Define demand paging
4. Define the terms logical memory and physical memory.
5. What is fragmentation?
6. What is thrashing?
7. Define virtual memory
8. Differentiate between logical memory and physical memory.
9. Differentiate between fragmentation & compaction.
10. What is logical address?

5 Marks:

1. Explain internal and external fragmentation.
2. Explain in detail segmentation with respect to memory management
3. Explain the concept of virtual machine with neat diagram.
4. Explain segmentation with an example.
5. Explain first fit, best fit and worst fit of contiguous memory allocation.
6. Explain swapping process with neat diagram.
7. Explain with neat diagram page allocation scheme.
8. Explain steps for handling page faults.
9. Explain paging with an example.
10. Consider the following reference string 1,2,3,4,1,2,5,1,2,3,4,5
    Calculate how many page faults would occur for the FIFO and optimal page replacement algorithms. Assuming 4 frames (Initially all the frames are empty).
11. Explain optimal page replacement and least recently used (LRU) page replacement algorithm considering the following reference string.
    (7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1)
12. 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
    Calculate the number of page fault that will occur for the following page replacement algorithm, assuming 3 frames.
    Initially all the frames are empty.
    a. LRU replacement b. Optimal Replacement.
13. Consider the following page reference string.
    1,0,7,1,0,2,1,2,3,0,3,2,4,0,3,0,2,1,0,7

Calculate how many pages faults would for FIFO & LRU replacement algorithms assuming 3 frames (Initially all are free)

10 Marks:

Discuss in detail about Least Recently Used (LRU) page replacement with example.

Unit 5

2 Marks:

1. List operations of file.
2. Define file. State any two file operations.
3. List different file attributes.

5 Marks:

1. Discuss the commonly used operation on file.
2. Briefly explain the layered structure of file system.
3. Explain linked list method of free space management
4. Discuss different directory structures.
5. Explain various file attributes.
6. Explain linked allocation method of allocating disk space to file.
7. Write a note on free space management.