OS important topics

Module 1:

Objectives, Functions and Evolution of Operating System, Operating system structures: Layered, Monolithic and Microkernel, System Calls

Module 2:

Process: Concept of a Process, Process States, Process Description, Process Control Block, Threads: Definition and Types, Problem on Scheduling types.

Module 3:

Concurrency: Race Condition, Principles of Concurrency, Interprocess Communication, Interprocess Communication, Process Synchronization, Mutual Exclusion: Requirements, Hardware Support (TSL), Mutual Exclusion: Operating System Support (Semaphores), Classical synchronization problems: Producer and Consumer problem. Readers Writers Problem

Sample Questions for reference:

1) What is Operating system? Explain various functions and objectives?
2) Differentiate between monolithic, layered and microkernel structure of OS.
3) Write a short note on system calls.
4) Explain different types of OS.
5) What are system calls? Explain any five system calls.
6) Draw and explain five state process model.
7) What is Process Control Block (PCB)? Analyze its role with respect to context switch.
8) What do you mean by process? Draw and explain process state diagram.
9) What are system calls? Explain five major categories of system calls.
10) What is context switch? Why it is said that context switch is pure overhead
11) Differentiate between process and threads.
12) Threads are lightweight entity. Justify.
13) Compare short term, medium term and long-term scheduler along with diagram
14) Describe microkernel operating system structure
15) What is thread? Describe any four advantages of multithreading model.
16) Differentiate Multitasking & Multiprogramming?
17) Explain various operating system services?

18) Explain Scheduling Queues?

19) Discuss various scheduling criteria

20) Explain schedulers and its types?

21) Differentiate various types of schedulers?

22) Describe the operating System as a resource Manager.

23)

Consider the following set of processes, with the length of CPU burst given in miliseconds.

Process	Burst time	Priority
P_1	10	3
P_2	1	i
P_3	2	3
P_4	1	4
P_5	5	2

The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0. Draw Gnatt charts for the following scheduling algorithms FCFS, SJF nonpreemptive priority) and RR (quantum = 1) and also calculate turn around time, average waiting time.

24)

Consider the following set of processes, assuming all are arriving at time 0.

process	Burst time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	5
P5	5	3

Calculate average waiting time and turn-around time for FCFS, SJF (Non-Pre-emptive), Priority and RR (Quantum=2).

25)

Calculate AWT, ATAT, Response Time and Throughput of the following processes using Shortest job first (Non Pre-emptive).

Process	Arrival Time (ms)	Burst Time (ms)
P1	1	7
P2	2	5
P3	3	1
P4	4	2
P5	5	8

26) What are Semaphores? Differentiate between Counting and Binary Semaphores.

27) Explain synchronization problem in detail. How counting semaphore can be used to solve readers writes problem.

28) Explain counting semaphore with example

29) Write a short note on Producer consumer problem using semaphore

30) Difference between pre-emptive and Non Pre-emptive Scheduling.

31) Differentiate between preemptive and non-preemptive scheduling techniques. Classify all scheduling techniques as preemptive and non-preemptive with justification.

32) Explain direct and indirect communications of message passing systems.

33) Explain in brief race condition?

34) Define the term critical section? What are the requirement for critical section problem?

35) Explain critical section problem with any one of different solutions.

36) What are semaphores? Explain two primitive semaphore operations. What are its advantages? How do they implement mutual exclusion?

37) Explain solution to producer-consumer problem using semaphores.

38) Explain the readers/writers problem? Give a solution for the same.

39) Describe the Bounded - buffer problem and give a solution for the same using semaphores.

40) What is mutual exclusion? Explain its significance.