**Question Bank for CAT – 1: Operating System**

1. **Define Operating Systems and list out the various types of Operating Systems.**
2. **What are the various types of operating systems?**
3. **Classify the various types of the operating system.**
4. **Explain different types of the operating system.**
5. **Show the following terminologies associated with the operating system and explain each in detail.   
   a)   Multiprogramming systems**

**b) Multitasking systems**

**c) Multiprocessor systems.**

1. **Illustrate the distinguishing features of i). Real time system ii) Multiprocessor system Identify the difference between mainframe and desktop operating system.**
2. **Describe the distinguishing features of  
   i) Real-time system ii) Multiprocessor system.**
3. **Justify the statement “Operating System can be viewed as a government, resource allocator and a control program”**
4. **Classify the Critical Section problem. Give the conditions that a solution to the critical section problem must satisfy.**
5. **Distinguish between hard real time systems and soft real time systems.**
6. **Distinguish among the following terminologies associated with the operating system and explain each of them in detail. I) Multiprogramming systems, ii) Multitasking systems, iii) Multiprocessor systems.**
7. **Distinguish between batch systems and time-sharing systems.**
8. **Describe the Operating system. Also, discover the Operating-System Functions.**
9. **Differentiate among the following types of OS by defining their essential properties. a) Time sharing system b) Parallel system c) Distributed system d) Real time system**
10. **Explain Process Control Block (PCB)**
11. **Compare the 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.**
12. **Associate a Relationship between FCFS and Round Robin Scheduling Algorithm.**
13. **Define semaphore and its types.**
14. **How will you implement mutual exclusion with test\_and\_set () instruction?**
15. **A Counting Semaphore was initialized to 12. then 10P (wait) and 4V (Signal) operations were computed on this semaphore. Explain the result?**
16. **Discuss the concept of Process. Explain various states of process with Process transition diagram.**
17. **Compare and contrast between short term and long-term Scheduler.**
18. **Establish Relationship between FCFS and Round Robin Scheduling Algorithm.**
19. **Define CPU scheduling. Explain pre-emptive and no pre-emptive scheduling. Give example.**
20. **Explain Round robin algorithm using an example.**
21. **Discover various CPU scheduling algorithm. Explain pre-emptive and no pre-emptive scheduling. Give example.**
22. **List the various scheduling criteria for CPU scheduling?**
23. **Consider the following process.   
      
    Process Id             Burst Time  
    P0                               5  
    P1                               6  
    P2                               1  
    P3                               2  
    P4                               6  
    Point out the average waiting time and average turnaround time for this process with   
    (i)FCFS Scheduling  
    (ii)SJF Scheduling  
    (iii) Round Robin with Time Quantum = 2**
24. **Consider the set of 5 processes whose arrival time and burst time are given below-  
    Process Id    Arrival time   Burst time   Priority  
    P1                   0                     4                  2  
    P2                    1                     3                  3  
    P3                    2                     1                  4  
    P4                    3                     5                  5  
    P5                    4                     2                  5  
    If the CPU scheduling policy is priority non-preemptive, calculate the average waiting time and average turnaround time**
25. **Consider the set of 6 processes whose arrival time and burst time are given below-**

**Process Id Arrival time Burst time**

**P1 0 4**

**P2 1 5**

**P3 2 2**

**P4 3 1**

**P5 4 6**

**P6 6 3**

**If the CPU scheduling policy is Round Robin with time quantum = 2, calculate the average waiting time and average turnaround time.**

**Consider the following process.  
Process    Arrival Time    Burst Time  
P1            0                        8  
P2             1                        4  
P3             2                        9  
P4             3                         5  
Draw a Gantt chart and point out the average waiting time and average turnaround time:  
(i)    FCFS Scheduling  
(ii)    SRTF Scheduling**

1. **Consider the set of 5 processes whose arrival time and burst time are given below-**

**Process Id Arrival Time Burst time**

**P1 0 5**

**P2 1 3**

**P3 2 1**

**P4 3 2**

**P5 4 3**

**If the CPU scheduling policy is Round Robin with time quantum = 2 unit, calculate the average waiting time and average turnaround time.**

1. **Analyze the kernel mode & user mode of an operating system. Write steps to switch between the two.**
2. **Illustrate briefly the Layered Operating system structure with a neat sketch.**
3. **Consider a system running two processes. Process A starts to read from the keyboard, and while it is waiting for input from the keyboard, system context switches happen and start running process B in user mode. Then, a key is pressed and the corresponding interrupt happens. Where will process B's registers be saved while the interrupt is happening? Justify your answer.**
4. **Differentiate between process and program.**
5. **Illustrate the rules for the critical section.**
6. **What are the different states of the process with the help of neat and clean diagram?**
7. **What is Long-Term, Short-Term, and Medium-Term schedulers?**
8. **Explain how a process is being created and terminated?**
9. **Explain Process Control Block in Operating System.**
10. **What is context switching? Discuss how context switching happens in OS?**
11. **Discuss different types of schedulers in OS. Which Schedular is a part of Time-sharing systems?**
12. **What is the purpose of a Process Control Block? What is the function of program counter in PCB?**
13. **Explain Dining Philosophers’ problem? Discuss the solution to the Dining philosopher’s problem using semaphores.**
14. **What is degree of multiprogramming? How this is controlled? What happens when the degree of multiprogramming is very low?**