**Questions worth pondering**

**Unit – 1: Computer System Overview, OS Overview**

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| 1 | Draw and explain: Top level view of computer |
| 2 | Explain basic instruction cycle using example. |
| 3 | What is interrupt? Explain its purpose. |
| 4 | How is an interrupt processed? Explain in detail. |
| 5 | Explain memory hierarchy. |
| 6 | Explain cache/main-memory structure and cache read operation in detail. |
| 7 | What is role of principal of locality in cache memory? |
| 8 | List cache design issues. |
| 9 | What is an operating system? Explain various objectives of operating system. |
| 10 | Draw and explain: layers and views of a computer system |
| 11 | Explain significance of any six services provided by operating system. |
| 12 | What is difference between batch multiprogramming system and time-sharing system? |

**Unit – 2: Process management**

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| 1 | What is process? Why is it necessary? What does the process metadata comprise of? Where does the Operating System maintain metadata of a process? |
| 2 | What is the role of process control block?<br>OR<br>How and where does the operating system maintain the control information of a particular process? |
| 3 | List various ways of process termination. |
| 4 | Explain five-state process model. |
| 5 | Explain six-state process model. |
| 6 | Explain seven-state process model. |
| 7 | List various reasons for process suspension. |
| 8 | List various OS control tables. |
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| 9 | What is multithreading? What are the key benefits of threads? |
| 10 | Draw and explain single threaded and multithreaded process models. |
| 11 | Give various examples of the uses of threads in a single-user multiprocessing system. |
| 12 | List and explain four basic thread operations associated with a change in thread state. |
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| 13 | List types of processor scheduling. Why are they important? |
| 14 | Scheduling affects the performance of the system. True/False. Why? |
| 15 | What is the role of long-term scheduler? |
| 16 | What is the role of medium-term scheduler? |
| 17 | How do the medium-term scheduler differ from long-term scheduler? |
| 18 | What is the function of short-term scheduler & dispatcher? |
| 19 | When is the short-term scheduler invoked? Also list some examples of such events. |
| 20 | Discuss short term scheduling criteria. |
| 21 | For a process in OS, how do the turn-around time, waiting time and service time differ from each other? |
| 22 | In the context of short-term scheduling, what is throughput? |
| 23 | In the context of processor scheduling, what is starvation? How to solve it? |
| 24 | What is the difference between non-preemptive algorithm and preemptive algorithm? |

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| 25 | In non-preemptive scheduling: once a process is in the running state, it will continue execution until it terminates. True/False. |
| 26 | Using suitable example, explain FCFS process scheduling. |
| 27 | Using suitable example, explain RR process scheduling. |
| 28 | Using suitable example, explain SJF process scheduling. |
| 29 | Using suitable example, explain SRT process scheduling. |
| 30 | Text book pg# 435: Problems 9.1 & 9.2 |
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| 31 | In the context of concurrency in Operating systems, explain: atomic operation, critical section, deadlock, starvation, race condition, mutual exclusion |
| 32 | What are the requirements for mutual exclusion? |
| 33 | What is semaphore? Why is it significant? Explain semaphore primitives. |
| 34 | Differentiate between binary semaphore and general semaphore. |
| 35 | What is the difference between strong and weak semaphore? |
| 36 | Discuss solution to the bounded buffer producer consumer problem using monitor. |
| 37 | What conditions are generally associated with the readers-writers problem? |
| 38 | Discuss solution to the reader-writers problem with readers have priority. |
| 39 | Discuss solution to the reader-writers problem with writers have priority. |