

COMPUTER SCIENCE

Paper : CS03 : Theory - A, Operating System Concepts

Time Allowed : Three Hours

Maximum Marks : 30

Note: Attempt five questions in all, including Q-9 in Section - E, which is compulsory, taking one each from Section-A to Section - D.

Section – A

1. Describe the objectives and functions of Operating System. Also explain the different services provided by the operating system. Describe the structure of an Operating System. 6
2. Describe the different types of Operating Systems and their salient features with examples. 6

Section – B

3. What is a Process Control Block (PCB)? What is it used for? What sort of information might it store? What is that information used for? What operating might be performed on it? Explain in detail. 6
4. Explain the advantages and disadvantages of Shortest - Job-First (SJF) scheduling. Explain why we say that the Multi-Level-Feedback-Queue (MLFQ) is an approximation to SJF. Why does MLFQ not have the disadvantages of SJF? 6

Section – C

5. Define deadlock. State four conditions of deadlock and explain how each condition can be satisfied? Give an example of a simple resource deadlock involving three processes and three resources. Draw the appropriate resource allocation graph. 6
6. What is the difference between deadlock prevention and deadlock avoidance? Explain Banker's algorithm for Deadlock avoidance. 6

Section – D

7. One of the design decisions in OS memory management is the choice between swapping and paging. Define each of these terms and clarify their respective roles in OS memory management. 6
8. Suppose there are 16 virtual pages and 4 pages frames. Determine the number of page faults that will occur with the reference string 0 1 7 2 3 2 7 1 0 3 12 13 12 7 1, if the page frames are initially empty, using FIFO and LRU page replacement algorithms. 6

Section – E

(Compulsory)

9. (a) Define multitasking. 6 × 1 = 6
- (b) What is Linux?
- (c) What is virtual memory?
- (d) What is preemptive CPU scheduling?
- (e) What is logical address space?
- (f) Define internal fragmentation.