

MCA/D-15
OPERATING SYSTEMS
PAPER-MCA-14-35

Time Allowed: 3 Hours

Maximum Marks: 80

Note: Attempt Five questions in all, selecting at least one question from each Unit.
Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Explain Open source operating system.
(b) Discuss inter-process communication.
(c) What is Race condition? Discuss.
(d) What is Thrashing?
(e) Compare and contrast network and distributed operating systems.
(f) Differentiate between Vulnerability and Threat.

UNIT-I

2. (a) What is a System call? How is different it from a subroutine or a subprogram?
Also discuss various types of system calls.
(b) Explain the process state diagram considering the suspended processes.
3. Discuss various algorithms for CPU-scheduling using suitable examples. Also make a comparative study of these algorithms.

UNIT-II

4. Discuss Classical process co-ordination problems and their solutions.
5. What is Deadlock? What are the necessary conditions for occurrence of a deadlock?
Write Banker's algorithm to avoid a deadlock and explain it using an example.

UNIT-III

6. (a) 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
How many page faults would occur for the following replacement algorithms, assuming three and four frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.
 - (i) LRU replacement
 - (ii) FIFO replacement
 - (iii) Optimal replacement.
- (b) What is Segmentation? Discuss segmentation hardware with the help of diagram. What type of fragmentation can be caused by segmentation?

7. (a) Discuss various disk scheduling algorithms.
(b) Explain various attributes and operations of a file. Also discuss the protection mechanism in a file system.

UNIT-IV

8. (a) Describe various domains of Protection. How protection is done in Unix?
(b) What is the Security problem? Discuss various security threats.
9. Explain Mutual exclusion in distributed systems. Discuss Centralized, Fully distributed and Token-passing algorithms to achieve mutual exclusion in distributed systems.