

Roll No. ....

Total Pages : 3

BT-4/J-22

44183

OPERATING SYSTEMS

Paper-PC-IT-206A

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

**UNIT-I**

1. (a) Identify and explain the roles of the following :
  - (i) PCB creation of processes. (3)
  - (ii) Context switching. (3)
  - (iii) Process hierarchies. (3)
- (b) What are the prime objectives of using scheduling?  
How preemptive and non-preemptive scheduling works?  
Briefly explain each of them. (6)
  
2. (a) Explain the following CPU scheduling algorithms :
  - (i) SJF. (3)
  - (ii) FCFS. (3)
  - (iii) Round Robin. (3)
- (b) Elaborate the roles of interrupts in operating systems.  
Discuss the technicalities of using various interrupts mechanisms in operating systems. (6)

## UNIT-II

3. (a) Define the deadlock states. Explain the scientific procedures of the following :
- (i) Deadlock avoidance. (4)
  - (ii) Deadlock prevention. (4)
- (b) Write and explain the solution for Reader-Writer classical synchronization problem using monitors. (7)
4. (a) What are the race conditions and write down the technical note on the mutual exclusion. (5)
- (b) Write and explain the Dining Philosophers Problem. Also, provide the solution for this problem using semaphores. (5)
- (c) Why monitors and message passing mechanisms are valuable in any type of inter-process communication? (5)

## UNIT-III

5. (a) Write short on the following :
- (i) Demand paging. (4)
  - (ii) Virtual memory. (4)
- (b) What is a page-fault? List all the steps of how a page-fault is serviced by the operating system. (6)
6. (a) Consider the following page reference string : 1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the LRU, FIFO, LFU and optimal page replacement algorithms assuming two and five frames? (9)

- (b) Explain the concept of Virtual memory. List any *two* methods for its implementation and explain any *one* of them with the help of a schematic diagram. (6)

#### UNIT-IV

7. (a) Draw and explain the flow of activity that takes place during a Remote Procedure Call (RPC) between two networked, systems. (8)
- (b) Differentiate between the following :
- (i) Logical and physical file systems.
  - (ii) Disk space management and file system management. (7)
8. (a) What is basic role of software and hardware in the security of distributed file systems? How will the distributed file systems be protected from an unauthorized use and virus attacks? (8)
- (b) Write short notes on the following :
- (i) Buffering.
  - (ii) Network operating system and NFS. (7)
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