

Roll No. ....

Total Pages : 03

**BT-4/M-20**

**34124**

**OPERATING SYSTEMS**

**IT-208N**

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) Process states 3
  - (ii) Process hierarchies 3
  - (iii) Context switching. 3
- (b) Elaborate the roles of interrupts in operating systems. Discuss the technicalities of using various interrupts mechanisms in operating systems. 6
2. (a) Explain the following CPU scheduling algorithms : 3+3+3
- (i) SJF (ii) FCFS
  - (iii) Round Robin.

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- (b) What are the prime objectives of using scheduling ?  
How does pre-emptive and non-preemptive scheduling work ? Briefly explain each of them. 6

### Unit II

3. (a) Explain and justify the roles of the following :
- (i) Producer-consumer problem 4
  - (ii) Banker's algorithm. 4
- (b) Write and explain the Dining Philosophers Problem.  
Also, provide the solution for this problem using semaphores. 7
4. (a) Define the deadlock states. Explain the scientific procedures of the following : 3+3
- (i) Deadlock Recovery
  - (ii) Deadlock Prevention.
- (b) Why monitors and message passing mechanisms are valuable in any type of inter-process communication ? 5
- (c) Explain and substantiate the concept of interprocess communication in operating systems. 4

### Unit III

5. (a) Write short notes on the following :
- (i) Demand Paging 3
  - (ii) Disk Space Management. 3
  - (iii) File protection using access control, security and authorization. 3

- (b) What is a page-fault ? List all the steps of how a page-fault is serviced by the operating system ? 6
6. (a) Explain the following security models :
- (i) Mandatory Access Control 3
  - (ii) Rule Based Access Control 3
  - (iii) Discretionary Access Control. 3
- (b) Explain the concept of Virtual Memory. List and explain any *one* method for implementation. 6

#### Unit IV

7. (a) Justify the role of using buffering. How can it be used for an effective management of various devices ? 8
- (b) Draw and explain the flow of activity that takes place during a remote procedure call (RPC) between two networked systems. 7
8. (a) Recognize the importance for employing dedicated devices and shared devices under device management. 8
- (b) 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. 7