BT-4/M-23                    44153

# OPERATING SYSTEMS
## PC-CS-206A

Time : Three Hours]                    [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

### Unit I

1. (a) Enumerate the different operating system structure and explain with neat sketch.                    **10**

   (b) What is the need of protection of a system ? How can it be achieved ?                    **5**

2. (a) Explain the purpose of system calls and discuss the calls related to device management and communication.                    **10**

   (b) List the services provided by an operating system.                    **5**

### Unit II

3. (a) What is dinning philosopher problem ? Explain its solution with semaphore.                    **10**

   (b) Define thread and explain advantages of using threads.                    **5**

4. Consider the following set of processes with CPU burst in milliseconds : **15**

| Process ID | Burst time | Priority |
|------------|------------|----------|
| P1 | 6 | 2 |
| P2 | 12 | 4 |
| P3 | 1 | 5 |
| P4 | 3 | 1 |
| P5 | 4 | 3 |

(i) Assume all processes arrived in order P1,P2,P3,P4,P5 all at time 0. Draw Gantt Chart using FCFS, SJF, priority scheduling( smaller number implies higher priority) and round robin scheduling (time quantum = 2).

(ii) For pre-emptive mode of shortest job first consider the arrival time P1(3), P2(1), P3(4), P4(0), P5(2). Using this draw Gantt chart.

(iii) Find the waiting time and turn around time for each process using the above scheduling algorithms in (i) and (ii) point. Also find which of the above algorithms results in minimal average waiting time.

**15**

## Unit III

5. Define deadlock. State and explain conditions that are necessary for deadlock to occur. Explain the use of Banker's algorithm for deadlock avoidance with example.

**15**

6. (a) For the page reference string :

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

Calculate the Page Faults applying (i) FIFO (ii) Optimal (iii) LRU Page replacement algorithms for a memory with three frames. 8

(b) Explain the concept of segmentation for memory management. Explain, why combined paged segmentation is used with illustration. 7

## Unit IV

7. (a) Consider disk having 200 tracks (0-199). The request sequence{82, 170, 43, 140, 24, 16, 190} of disk and the head start is at request 50, find the total head movement to satisfy all the requests for each of the following disk scheduling algorithms-FCFS, SSTF, SCAN, CSCAN. 10

(b) Write a short note on DMA. 5

8. Discuss in detail about different file allocation methods. Also give advantages and disadvantages of each of them. 15