Total No. of Questions : 12]

SEAT No. :

**P2459**

[Total No. of Pages : 3

# [5153]-93
# T.E.(IT)
# OPERATING SYSTEMS
# (2008 Pattern) (Semester-I)

*Time : 3 Hours]* *[Max. Marks :100*

***Instructions to the candidates:***

1) ***Answer THREE questions from each section,***
2) ***Answer to the Two sections should be written in SEPARATE answer books.***
3) ***Figure to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

## SECTION-I

***Q1)*** a) Describe with the help of neat diagram the interaction of operating system with hardware. **[8]**

b) Draw and explain the architecture of windows 2000. **[8]**

OR

***Q2)*** a) State in brief the four key features of each of the following types of OS. **[8]**

i) Batch
ii) Distributed
iii) Multithreading
iv) Time-sharing

b) Explain modern UNIX kernel with a neat diagram. **[8]**

***Q3)*** a) Consider the following set of processes, with the length of processes given in milliseconds. Solve the problem using FCFS & Round Robin scheduling (Assume time quantum equal to 1). **[12]**

| Process | Arrival time | Burst time |
|---|---|---|
| P1 | 0 | 6 |
| P2 | 2 | 2 |
| P3 | 4 | 3 |
| P4 | 6 | 4 |
| P5 | 8 | 5 |

i) Draw Gantt chart illustrating the execution of these processes.
ii) Calculate waiting time and turnaround time for each process.
iii) Calculate the average waiting time and turnaround time for all the processes.

b) Explain UNIX Multi-level feedback queue scheduling. **[6]**

OR

***P.T.O.***

***Q4)*** a) What is the difference between Process and Thread? What are the contents of Thread Control Block (TCB). State the advantages and disadvantages of user level threads. **[12]**

b) What is System call? Explain fork () System call. **[6]**

***Q5)*** a) Consider the following state of the system. Check Whether System is in Deadlock State or not. **[8]**

| | Allocation matrix | | | | Max matrix | | | | Available vector | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| P0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 |
| P1 | 2 | 0 | 0 | 0 | 2 | 7 | 5 | 0 | | | | |
| P2 | 0 | 0 | 3 | 4 | 6 | 6 | 5 | 6 | | | | |
| P3 | 2 | 3 | 5 | 4 | 4 | 3 | 5 | 6 | | | | |
| P4 | 0 | 3 | 3 | 2 | 0 | 6 | 5 | 2 | | | | |

b) Explain the conditions for the occurrence of Deadlock? **[8]**

OR

***Q6)*** a) Implement the Producer Consumer problem using Semaphores and discuss how the critical section requirements are fulfilled. **[8]**

b) What is Inter Process Communication? Explain different methods of IPC. **[8]**

## SECTION-II

***Q7)*** a) Explain internal and external fragmentation. **[8]**

b) Free memory holes of sizes 100K, 500K, 200K, 300K, and 600K are available. The processes of size 200K,417K,112K and 426K are to be allocated. How processes are to be placed in **[8]**

i) First Fit

ii) Best Fit

iii) Worst Fit

iv) Next Fit.

c) What is thrashing? **[2]**

OR

***Q8)*** a) A process contains following virtual pages on disk and is assigned a fixed allocation of three frames in main memory. Show successive pages residing in the three frames using FIFO, LRU, and Optimal.

Reference string:7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. **[8]**

b) Explain segmentation in detail with suitable diagram. **[6]**

c) Describe the following term in brief: **[4]**

i) Principle of locality

ii) Belady's anomaly?

***Q9)*** a) Assume the disk head is initially positioned over track 53. For the disk track request 98, 183, 37, 122, 14, 124, 65, 67 show head movement of cylinders using FCFS, SSTF, SCAN, C-SCAN. **[8]**

b) What are the different buffering ways in I/O buffering? **[8]**

OR

***Q10)***a) What is RAID? Explain the advantages and disadvantages of RAID. Also explain seven RAID levels in brief. **[10]**

b) Draw and explain UNIX I/O structure and explain in detail role and implementation of buffer cache in UNIX I/O subsystem. **[6]**

***Q11)***a) What is the difference between passive and active security threats? **[6]**

b) Describe two approaches to intrusion detection. What does audit record contain? **[6]**

c) Write note on Protection Domain. **[4]**

OR

***Q12)***a) Explain with the diagram the taxonomy of malicious programs. **[8]**

b) Explain protection policy and mechanism in details. **[8]**