TYCS

Sub :- Operating System

(2.5 Hours) [ Total Marks : 75

N.B. (1) All questions are compulsory.
(2) **Figures to the right indicate the marks.**
(3) Illustrations, in-depth answers and diagrams will be appreciated.
(4) **Mixing of sub-questions is not allowed.**
(5) Assume suitable data if needed.

1. Attempt the following :- (any THREE) 15
   (A) Describe any five operating system services.
   (B) Compare Layered based Approach and Kernel based Approach.
   (C) Describe Multiprocessor Systems and its advantages.
   (D) What is a system call? List out the File Management and Device Management System calls.
   (E) What is a PCB? Discuss the information associated with a PCB.
   (F) Describe the Operations on process.

2. Attempt the following :- (any THREE)
   (A) Describe Indirect Communication Message Passing System? 15
   (B) What is a Thread? Discuss the Multithreading Models.
   (C) Explain process scheduling with the help of a Queuing diagram.
   (D) Describe Semaphores and Operations performed on it? What is a Binary semaphore?
   (E) What is critical section problem? Describe the requirements to the solution of critical section problem.
   (F) Consider the following set of processes, with the length of CPU - burst time in milliseconds.

[ TURN OVER

2

| Process | Arrival Time | Priority | Burst Time |
|---------|--------------|----------|------------|
| P 1 | 2 | 1 (Highest) | 8 |
| P2 | 0 | 3 (Lowest) | 4 |
| P3 | 1 | 2 | 1 |

Illustrate the execution of the processes using Priority (preemptive) scheduling. Draw Gantt chart. Also calculate the average waiting time and average turn around time for the processes.

3.    Attempt the following :- (any THREE)

(A)    Discuss the solution to Dining philosopher's problem using monitors.        15

(B)    What is a deadlock? Discuss the characteristic features of Deadlock.

(C)    Discuss Segmentation as a memory management scheme.

(D)    Discuss the techniques of Recovery from deadlock.

(E)    Explain with diagram the steps in handling a page fault.

(F)    For the following page reference string, calculate number of page faults using LRU page replacement algorithm with frame size = 3 and Reference string = 1,2,3,4,2,5,6,2,3,2.

4.    Attempt the following :- (any THREE)

(A)    What is a file? Discuss the Attributes of the files.        15

(B)    Explain the single-level Directory and Two level Directory Structure.

(C)    Discuss Direct Memory Access.

(D)    Explain :

    (i)    Intrusion Detection

    (ii)    Firewall

(E)    Discuss :

    (1)    Virus

    (2)    Denial of Service

(F) Assume that the disk drive has 300 cylinders, numbered from 0 to 299. The drive is currently serving a request at cylinder 110. The pending request queue is 100, 40, 120, 210, 240, 180 (Assume head movement is in direction of 299) What is the total distance travelled by the head for 'SCAN' disk scheduling algorithms.

5. Attempt the following :- (any THREE)                          15

(A) Explain 5 - State process model diagram and its states.

(B) Describe user threads and kernel threads.

(C) What is a Banker's Algorithm? Explain the data structures needed for it.

(D) Discuss the Free-space management Techniques of the disk.

(E) Discuss types of schedules.

(F) Define the following terms :

    (1) First Fit

    (2) Best Fit

    (3) Worst Fit

    (4) External Fragmentation

    (1) Compaction