United College of Engineering and Research, Allahabad
Operating System
B. Tech (4th Semester) CSE & IT
Third Sessional Exam, 2016-17

Time: **2** hours   Max Marks: **30**

Section A

Attempt All Questions in section A   **(10x1=10)**

1. What is multiprocessor operating system?
2. Draw the layered architecture of operating system.
3. What is semaphore? Differentiate between binary and counting semaphore.
4. What is safe state?
5. Define the difference between preemptive and non preemptive scheduling?
6. Draw a labeled Process State Transition diagram.
7. What is aging?
8. What is page fault?
9. List the various techniques to remove fragmentation.
10. Why page size always power of 2?

Section B

Attempt Any three Questions from section B   **(4x3=12)**

1. What are the necessary conditions to hold a deadlock in a system?
2. Give the solution of Producer Consumer problem by using the concept of Semaphore?
3. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order). How would each of the first-fit, Best-fit and worst-fit algorithms place processes of 212K, 417K, 112K and 426K (in order)? Which algorithm makes the most efficient use of memory?
4. Define message passing and shared memory inter process communication.
5. How many page faults will occur for the following reference string

    7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

    using the following algorithms:
    a. FCFS
    b. LRU

Section C

Attempt Any one Questions from section C   **(8x1=8)**

1. Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is

    86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

    Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
    a. SCAN
    b. C-SCAN
    c. LOOK
    d. C-LOOK

P. T. O.

2. Write short notes on any four of the following:
   a. Process Control Block
   b. Multilevel feedback queue scheduling
   c. Thrashing
   d. Directory
   e. RAID
   f. I/O Buffering
   g. File access methods

3. Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4 and P5 all at time 0.

   a) Draw Gantt charts illustrating the execution of these processes using FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1) scheduling.
   b) What is the turnaround time of each process for each of the scheduling algorithms in part a?
   c) What is the waiting time of each process for each of the scheduling algorithms in part a?
   d) Which of the schedules in part a results in the minimal average waiting time (over all processes)?