Bachelor Level/ Second Year/ Third Semester/ Science   Full Marks: 60
Computer Science and Information Technology (Csc. 203)   Pass Marks: 24
(Operating System)   Time: 3 hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Section A

Attempt any two questions: **(2x10=20)**

1. Explain "race condition" and also state how process synchronization in handled using semaphore? Explain with algorithms.

OR

Suppose three peoples are in a line waiting for a department store to open for "the big sale". When the door opens, all three rush the door opens, all three rush the door, but the door is not big enough for all them to pass through at once. Describe a solution for addressing this deadlock that will allow three people to pass through the door. Which of the 4 necessary deadlock condition does your solution break? Explain.

2. Consider the following page reference string 1,3,5,4,7,1,5,6,1,2,3,7,6,3,4,1,3,8. How many pages faults would occur for each of the following page replacement algorithms assuming 3 frames?
   - a) FIFO
   - b) OPR
   - c) LRU

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

Process	Burst time	Arrival time
P1	10	0
P2	15	2
P3	22	3
P4	16	5
P5	5	6

For the given data, draw Gantt charts that illustrate the execution of these processes using SJF and Robin algorithms with quantum 4 milliseconds.

Section B

Attempt any eight questions: **(8x5=40)**

4. Do you think a process can exist without any state? Justify your view with the help of process state transition diagram.

5. Suppose that a disk drive has the cylinder numbered from 0 to 4999. The head is currently at cylinder number 143. The queue for services of cylinder is as 86, 1470, 9113, 17174, 948, 1509, 1022, 1750 and 130. What is the total head movement in each of following disk algorithm to satisfy the requests?
   - a) FCFS
   - b) SSTF

6. Define deadlock. How deadlock can be prevented?

7. What is the advantage of interrupt over polling? Explain the working mechanism of interrupt controller.

8. Are there any linkages between semaphore and deadlock condition? If yes, explain with an example.

9. Describe the methods for implementing directories with examples.

10. What is the difference between physical address and virtual address? Explain the conversion f virtual address into physical address by MMU.

11. Differentiate between time sharing and real time system.

12. Explain about bit map and linked list memory management system.