Bachelor Level/ Second Year/ Third Semester/ Science　　　　Full Marks: 60
Computer Science and Information Technology　　　　　　　Pass Marks: 24
(CSc. 203) (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. What is race condition? Calculate Average Waiting and Average Turnaround time of the given set of processes in table below using SJF and RR scheduling algorithm. [Note: Quantum time for RR = 3]

Process id	Arrival Time	Execution Time
A	0	8
B	2	14
C	9	19
D	19	7
E	25	15

2. What is deadlock? Explain various conditions for deadlock. Discuss the Bankers algorithm of multiple resources for avoidance of deadlock with suitable example.

3. How physical address is generated from logical address? Explain the process of system call with suitable diagram.

Section B

Attempt any eight questions:(8x5=40)

4. What is an operating system? Differentiate between time sharing and real time operating system.

5. How does process differ from program? Explain process state with the help of block diagram.

6. Explain how multithreading improve performance over a single threaded solution.

7. Describe how Peterson's solution preserve mutual exclusion in process CR execution.

8. Given a references to the following pages by program,

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

　How many page faults will occur if the program has three page frames available to it and uses LRU replacement?

9. What is deadlock? State the conditions necessary for deadlock to exist. Give reason, why all conditions are necessary.

10. What is Fragmentation? Differentiate between internal and external fragmentation.

11. How does DMA increase system concurrency? How does it complicate hardware design?

12. Write short notes on:

　　a. Disk formatting

　　b. Memory Mapped I/O