Paper: Operating Systems Concepts

Code: INFO3102

Chapter: Process Synchronization

Full Marks: 100

1. Define and explain with proper example what is Race Condition? How this can be solved?	6+2=8
2. Explain the necessary conditions of critical section. What do you mean by entry section and exit section?	6+3=9
3. What are the different software and hardware-oriented solutions for critical section?	3
4. Discuss the solutions of critical section using the following methods and also discuss the advantage and shortfalls of each of these methods: a) Algorithm 1 b) Algorithm 2 c) Dekker's Algorithm d) Peterson's Algorithm e) Disabling Interrupt f) Swapping lock g) Test and Set Lock	7x5=35
5. Discuss Lamport Bakery Algorithm. Why this is special?	5
6. What is semaphore? What is the different usage of semaphore? What are the different types of semaphore? Explain.	3+3+4=10
7. What is meant by busy waiting or spinlock? Why it is not recommended to adapt this method? How without using spinlock we can implement semaphore?	3+1+4=8
8. With proper example show how using semaphore may result to deadlock.	2
9. Describe how using semaphore we can solve the following problems: a) Readers Writers Problem b) Dining Philosophers' Problem c) Producer Consumer Problem	5x3=15
10. How we can redesign the solution of Dining Philosophers' Problem using semaphore to avoid the possibilities of deadlock?	3
11. What is monitor corresponding to semaphore?	2