AOS Quiz#2
All questions carry equal marks. Total marks -10

Q#1- Explain the Reader Writer problem for synchronization, (define &how it work)

Answer:

- A data set is shared among a number of concurrent processes
  - Readers – only read the data set; they do not perform any updates
  - Writers – can both read and write.
- Problem – allow multiple readers to read at the same time. Only one single writer can access the shared data at the same time.
- Shared Data
  - Data set
  - Semaphore mutex initialized to 1.
  - Semaphore wrt initialized to 1.
  - Integer readcount initialized to 0.

- The structure of a writer process

```
do {
    wait (wrt) ;

      //    writing is performed
    signal (wrt) ;
} while (true)
```

- The structure of a reader process

```
do {
    wait (mutex) ;
    readcount ++ ;
    if (readercount == 1)  wait (wrt) ;
    signal (mutex)

        // reading is performed
    wait (mutex) ;
    readcount  - - ;
    if redacount  == 0)  signal (wrt) ;
    signal (mutex) ;
} while (true)
```

Q#2-Discuss the three basic conditions to avoid synchronization problem.

Answer:

1. Mutual Exclusion - If process P_i is executing in its critical section, then no other processes can be executing in their critical sections

2. Progress - If no process is executing in its critical section and there exist some processes that wish to enter their critical section, then the selection of the processes that will enter the critical section next cannot be postponed indefinitely

3. Bounded Waiting - A bound must exist on the number of times that other processes are allowed to enter their critical sections after a process has made a request to enter its critical section and before that request is granted

- Assume that each process executes at a nonzero speed
- No assumption concerning relative speed of the N processes