(b) State and explain difference between sender initiated and receiver initiated distributed scheduling algorithm.

(c) Differentiate load balancing and load sharing.

**4 + 6 + 2 = 12**

**Group - D**

6. (a) Write Migration algorithm and Full replication algorithm in DSM.

(b) Explain Sequential consistency and processor consistency in distributed shared memory.

(c) Explain two different coherence protocol in DSM.

**4 + 4 + 4 = 12**

7. Discuss the following multiprocessing architectures:
   (i) Shared nothing (pure cluster)
   (ii) Shared disks
   (iii) Shared memory cluster (SMC)
   (iv) Shared memory.

**4 ×3 = 12**

**Group - E**

8. (a) What do you mean by hard real time system and soft real time system? What is periodic, aperiodic and sporadic job?

(b) Consider a system that contains four independent periodic tasks :
$T_1 = (4, 1)$, $T_2 = (5, 1.8)$, $T_3 = (20, 1)$, $T_4 = (20, 2)$
Construct a cyclic schedule for the above mentioned four tasks.

**6 +6 = 12**

9. Write Short notes on **any three** of the following:
   (a) EDF Scheduling
   (b) RMA Scheduling
   (c) Cyclic Scheduling
   (d) Clock driven Scheduling

**(3 × 4) = 12**





**ADVANCED OPERATING SYSTEM**
**(CSEN 5202)**

**Time Allotted : 3 hrs** **Full Marks : 70**

***Figures out of the right margin indicate full marks.***

***Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.***

***Candidates are required to give answer in their own words as far as practicable.***

**Group – A**
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) In distributed system each processor has its own
(a) local memory (b) clock
(c) both (a) and (b) (d) none of the mentioned.

(ii) If one site fails in distributed system
(a) the remaining sites can continue operating
(b) all the sites will stop working
(c) directly connected sites will stop working
(d) none of the mentioned.

(iii) Two events that are correlated with happened Before Relation are called
(a) concurrent event (b) causal event
(c) synchronous event (d) all of these.

(iv) According to the Ricart-Agrawalla algorithm if P1 wants to execute the critical section and P2 is already executing in the critical section then P2 will reply to the request of P1,
(a) always (b) if time stamp of P1 < P2
(c) if time stamp of P1 > P2 (d) when P2 has finished.

(v) In distributed file system, when a file's physical storage location changes,
(a) file name needs to be changed
(b) file name needs not to be changed
(c) file's host name needs to be changed
(d) file's local name needs to be changed.

(vi) In the P-out-of Q request model of deadlock , if P=Q then it becomes
(a) AND (b) OR
(c) AND-OR (d) all of these.

(vii) Phantom deadlock occurs in distributed system only when there is
(a) false path (b) false knot
(c) false cycle (d) none of these.

(viii) Preemptive, priority based scheduling guarantees
(a) hard real time functionality (b) soft real time functionality
(c) protection of memory (d) none of these.

(ix) In _____ task the minimum separation between two consecutive instance of the task is the relative deadline.
(a) periodic (b) sporadic
(c) aperiodic (d) none of these.

(x) In rate monotonic scheduling
(a) shorter duration job has higher priority
(b) longer duration job has higher priority
(c) priority does not depend on the duration of the job
(d) none of the mentioned.

## Group - B

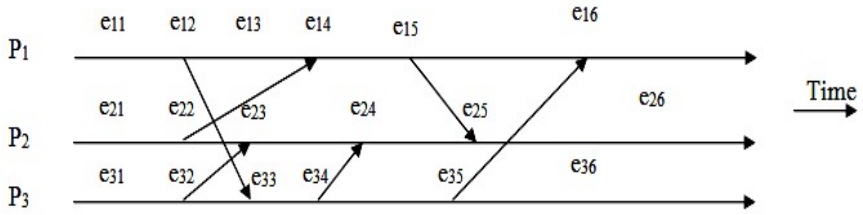
2. (a) Explain different issues in designing Distributed OS

(b) Why do most RPC system supports "Call by Value" semantics for parameter passing?

(c) What is Partial ordering of events in a distributed system?

**6 + 4 + 2 = 12**

3. (a)




The above figure shows events of three processes P1, P2 and P3 . Let eij denotes the jth event of process Pi . Arrows indicate transmission of message. Assume the processes use Lamport's logical clocks





where Ci denotes the local clock at process Pi . The initial value of Ci = 0 for every process Pi . Assume that the increment value is d=1 for all processes. **To each event shown in the figure, assign the correct clock value.**

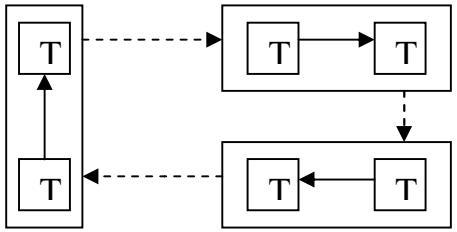
(b) Write Suzuki-Kasami's token-based algorithm. How is Suzuki-Kasami's algorithm different from Ricart-Agarwala's algorithm (in terms of message complexity and synchronization delay)?

(c) What is the limitation of Lamport's logical clock?

**4 + (4 + 2) + 2 = 12**

## Group - C

4. (a) Consider the following distributed wait-for-graph (DWFG):



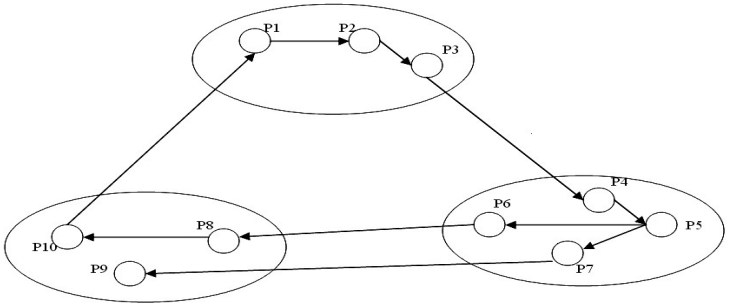

Apply Obermark's algorithm for distributed deadlock detection to this example.

(b) Describe deadlock detection using 'centralized controller' with example.

(c) Define Phantom Deadlock.

**5 + 4 + 3 = 12**

5. (a)




Show the probe message propagation along each edge for the above figure and then determine any deadlock exists there or not.