

CE7-R3: REAL TIME SYSTEMS

NOTE:

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Why less buffer space is required in warmhole switching?
- b) Explain, atleast three uni-processor scheduling algorithms in brief.
- c) How Fault-tolerance is managed by properly using redundancy?
- d) Why does it become difficult to predict the response time of transactions?
- e) Explain briefly what do you understand by rollback and recovery. Why can't hard real time systems use rollback for error detection/recovery?
- f) How can fault-tolerant communication be achieved in the presence of link and node failures?
- g) Explain how absolute and relative consistency differs?

(7x4)

2.

- a) How is each node in a network guaranteed timely access to the networks? Explain Time-token protocol in detail with a flow chart.
- b) What are the properties of performance measures for control computers?
- c) Explain the difference between Clock-Driven Scheduling and Priority Driven Scheduling of periodic tasks.

(8+4+6)

3.

- a) Suppose that a system is in an unsafe state. Show that it is possible for the processes to complete their execution without entering a deadlock state.
- b) Why is the polling latency typically faster than the interrupt latency?

(10+8)

4.

- a) By giving state diagram of the fault classes, explain the causes for different types of faults and their remedies.
- b) What are the various methods of concurrency control? Which of these may lead to deadlock and why?

(10+8)

5.

- a) Prove that the Rate monotonic algorithm is an optimal static-priority algorithm.
- b) CSMA is an efficient communication scheme in case of end-to-end transmission delay is much less than the average time to transmit a packet and when the load is not very high but not for priority algorithm. In this context, explain, Virtual Time Carrier Sensed Multiple Access (VTCSMA) with the helps of real-diagram of virtual clock in VTCSMA.

(9+9)

6.

- a) Compare Bluetooth and IEEE 802.11b in terms of internet applications, cost of technology, throughput achieved, power consumption, range of communication and multiple access technology.
- b) What are the features of network topology for a distributed system, and illustrate few topologies neatly.

(9+9)

7.

- a) For the following task set, find the response time for task t4.

<i>Priority</i>	<i>Period</i>	<i>Comp.</i>	<i>time</i>
t1	1	101	1
t2	2	122	2
t3	3	308	8
t4	4	600	20

- b) Explain static pairing.
- c) Draw the schematic of a timing estimation system and briefly explain the same.

(8+5+5)