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) Differentiate between Real Time Computer Systems and General purpose Computer Systems.
b) Why does real time operating system have microkernel?
c) What is done in Test, Integrate and Debug phase of software life cycle model? Why does this phase take almost 50% software effort?
d) Can hardware fault-tolerance techniques be easily adapted to provide software fault-tolerance?
e) What are factors which make it difficult to predict the response times of transactions (using databases) in real time systems?
f) What is performability? How is it used in real time system?
g) What do you understand by clock synchronization?

(7x4)

2.

a) Sometimes a transaction that would have been aborted under the two-phase locking scheme can commit successfully under the optimistic scheme. Why is this?
b) What are the components of a real time system? Draw schematic block diagram of real time system.
c) Why are transport protocol (TCP) and Internet Protocol (IP), not suitable for real time application?

(6+6+6)

3.

a) Prove that a system T of independent, preemptable tasks with relative dead – lines equal to their respective periods can be feasibly scheduled as one processor if and only if the total utilization is equal to or less than one.
b) Explain Earlier–Deadline–First **(EDF)** scheduling algorithm and how it is implemented in real time system.

(12+6)

4.

a) What are major steps involved in producing an object structured (oriented) design? Explain any one step in detail.
b) What is expected from high level language for real time system? What features of language will help to meet these expectations? Explain any two features in detail.

(6+(4+4+4))

5.

a) What is drift rate of clock? Why do we want that drift rate to be as small as possible?
b) What is internal synchronization? Explain non-fault tolerant synchronization algorithm.

(6+[2+10])

6.

a) How does network topology for distributed system affect the system response time and reliability? What are the important features in this regard?

b) Which is the protocol widely used for single channel broadcast network and the bus and ring topology? Explain and draw the algorithm of this protocol.

(9+9)

7.

a) What is expected in performance measures for real time systems and why?

b) What properties of good performance measures must be there for real time system and why?

(6+12)