Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (COMPUTER AND COMMUNICATION ENGINEERING) MAKEUP EXAMINATIONS, JAN 2017

SUBJECT: DISTRIBUTED SYSTEMS [ICT 411]

REVISED CREDIT SYSTEM
(04/01/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.
- Draw diagrams whereever necessary.

1A. Write a RMI program to calculate difference between two numbers. Explain in detail the steps involved in creating and compiling the above program **5**

1B. Compare and contrast URI, URL and URN **3**

1C. What is the difference between a vertical distribution and a horizontal distribution? **2**

2A. There are two replicas as shown in the Fig Q.2A that operate on a conit containing the data items x and y. Both variables are assumed to have been initialized to 0. Operation <5,B> is committed at A. Find the order deviation and numerical deviation at both the replicas with detailed steps. **5**

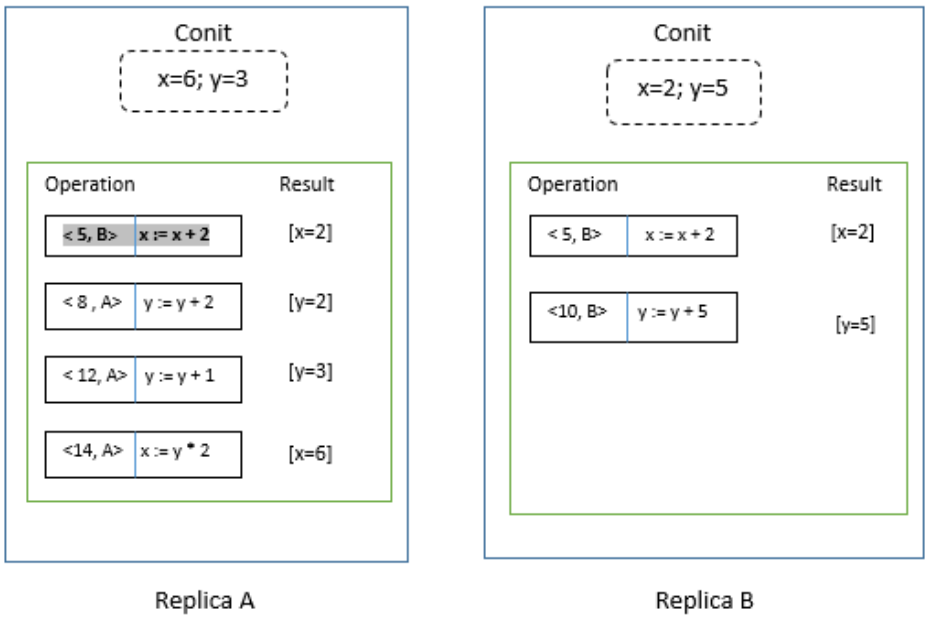

Fig Q.2A

2B. The clock of a clock tower in the town of Manipal broke. It was repaired but now the clock needs to be set. A train leaves for the nearest town, Kundapur, 100 miles away. It returns 4½ hours later with a report that the time according to the clock tower in Kundapur is 4:05.

i. To what value should the time be set on the clock tower?

ii. The maximum speed that the train can travel is 50 mph. What is the error of the clock? **3**

2C. Explain the two NFS protocols along with their significance. **2**

3A. List and discuss in detail the requirements of distributed file systems. **5**

3B. Illustrate and explain the three ways to construct a multi-threaded server. **3**

3C. Explain with an example, Cristian's and Berkeley clock synchronization algorithms. **2**

4A. Explain the following with respect to Chandy and Lamport's "Snapshot" algorithm for determining global states of distributed systems.

i. Assumptions of the algorithm

ii. Role of marker messages

iii. Two rules defined in the algorithm **5**

4B. What are the different RPC call semantics? Explain. What fault tolerance measures are provided by each of the call semantics? **3**

4C. Explain with an example, how exceptions are handled in CORBA IDL. **2**

5A. Explain in detail the following examples of distributed systems

i. Web Search

ii. Massively multiplayer online games (MMOGs)

iii. Financial trading **5**

5B. Describe the problem of unbound names in multicast navigation. Identify and discuss different types of DNS queries possible? **3**

5C. A client attempts to synchronize with a time server. It records the round-trip times and timestamps returned by the server in the Fig Q.5C. Which of these times should it use to set its clock? To what time should it set it? Estimate the accuracy of the setting with respect to the server's clock.

Round trip (ms)	Time (hr:min:sec)
22	10:54:23.674
25	10:54:25.450
20	10:54:28.342

Fig Q.5C **2**

6A. Explain the three approaches to external data representation and marshalling. Give examples for each. **5**

6B. List the three main software components that may fail when a client process invokes a method in a server object, giving an example of a failure in each case. To what extent are these failures independent of one another? **3**

6C. Compare the three mutual exclusion algorithms in terms of number of messages per entry/exit and delay before entry. **2**