Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL
(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

END SEMESTER EXAMINATIONS, APRIL/MAY 2019

SUBJECT: DISTRIBUTED SYSTEMS [ICT 3201]

REVISED CREDIT SYSTEM
(25/04/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data, if any, may be suitably assumed.

1A. Explain the different types of indirect communication paradigms that the entities use to communicate in a distributed system. **5**

1B. Explain the concept of hard mounting and soft mounting in NFS. How does the NFS auto-mounter help to improve the performance and scalability of NFS? **3**

1C. A client makes remote procedure calls to a server. The client takes 5 milliseconds to compute the arguments for each request, and the server takes 10 milliseconds to process each request. The local operating system processing time for each send or receive operation is 0.5 milliseconds, and the network time to transmit each request or reply message is 3 milliseconds. Marshalling or un-marshalling takes 0.5 milliseconds per message. Calculate the time taken by the client to generate and return from two requests. **2**

2A. With a neat diagram explain the working of Sun Network File System (NFS) architecture. **5**

2B. Explain the three approaches used in handling external data representation in distributed system with respect to the 'Singer' structure as given below:

```
struct Singer{
        string name;
        string genre;
        unsigned long numofsongs;
    };
```

Values given are {'Amlan','Pop',200} **3**

2C. List and explain the challenges in the design of scalable distributed systems. **2**

3A. Explain with an example the various types of navigation used in name resolution. **5**

3B. Illustrate Byzantine agreement problem considering four processes where one of them is a faulty process. **3**

3C. Explain the working principle of implementation repository in the CORBA architecture. **2**

4A. With a neat diagram illustrate how primary based protocols work with an example. **5**

4B. For the given replica's, in Fig.Q.4B, considering <4, B> and <12, A> as committed operations, find the values for the following along with steps:

i) Ordering deviation at A & B
ii) Numeric deviation at A & B

Replica A		Replica B	
Conit: x=5;y=7		Conit: x=3;y=5	
Operation	Result	Operation	Result
<4,B> x=x+2	x=2	<4,B> x=x+2	x=2
<5,A> x=x+3	x=5	<7,B> y=y+3	y=3
<7,B> y=y+3	y=3	<12,A> y=y+1	y=4
<12,A> y=y+1	y=4		
<16,A> y=y+2	y=6		

Fig.Q.4B **3**

4C. Discuss how hybrid form of update propagation overcomes the disadvantages of pull-push based protocols. **2**

5A. Explain how two-phase commit protocol works in distributed transaction. **5**

5B. Specify and justify the kind of consistency preferred in the following:

i) To implement an electronic stock market
ii) Displaying web pages that have just been updated
iii) Personal mail box for a mobile user implemented as distributed database **3**

5C. Consider the following Fig.Q.5C for processes P1, P2 and P3 executing in a distributed system. Compute the vector timestamp for each event.

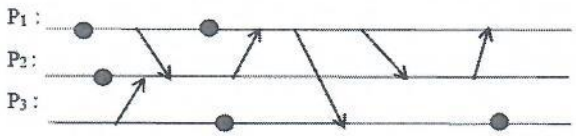

Fig.Q.5C **2**