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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL
*(A constituent unit of MAHE, Manipal)*

## VI SEMESTER B.TECH. (INFORMATION TECHNOLOGY),

## MAKEUP EXAMINATIONS, JUNE 2019

## SUBJECT: DISTRIBUTED SYSTEMS [ICT 3201]

**REVISED CREDIT SYSTEM**
**(10/06/2019)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

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

**1A.** Explain the following with respect to JAVA RMI.
i) Binder
ii) Activation of remote objects
iii) Persistent object stores
iv) Reflection
v) Garbage collection — **5**

**1B.** Explain the main nonfunctional properties of systems that affect the quality of the service experienced by clients and users. — **3**

**1C.** Sun XDR marshals data by converting it into a standard big-endian form before transmission. Discuss the advantages and disadvantages of this method when compared with CORBA's CDR. — **2**

**2A.** Explain access control authentication, mount service and path name translation in Sun NFS. — **5**

**2B.** Define the integrity property of reliable communication and list all the possible threats to integrity from users and from system components. What measures can be taken to ensure the integrity property in the face of each of these sources of threats. — **3**

**2C.** Differentiate the two variants of the interaction model of distributed systems — **2**

**3A.** Explain any FIVE transparencies achieved in online shopping application. — **5**

**3B.** What are the techniques used to mask the failures? Explain how triple modular redundancy works to mask the failure in hardware. — **3**

**3C.** Explain concurrency control in distributed transactions with an example. — **2**

**4A.** Discuss five different classes of failures that can occur in Remote Procedure Call (RPC) systems and also their respective solutions. — **5**

**4B.** Discuss the advantages and disadvantages of pull and push based design to propagate the content update in relevant replica. — **3**

**4C.** Illustrate Bully election algorithm. **2**

**5A.** Explain client centric models used in replication with an example. For the given replica's, in Fig.Q.5A, 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+3 | x=3 | <4,B> x=x+3 | x=3 |
| <5,A> x=x+2 | x=5 | <7,B> y=y+4 | y=4 |
| <7,B> y=y+4 | y=4 | <12,A> y=y+1 | y=5 |
| <12,A> y=y+1 | y=5 | | |
| <16,A> y=y+2 | y=7 | | |

Fig.Q.5A **5**

**5B.** What is process resilience? Mention the advantages and disadvantages of flat and hierarchical group. **3**

**5C.** Illustrate the operation of Lamport's algorithm for mutual exclusion given in Fig. Q.5C.

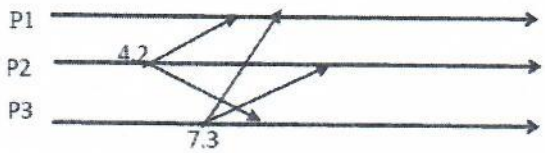


Fig.Q.5C **2**