Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. (INFORMATION TECHNOLOGY)

MAKEUP EXAMINATIONS, JUNE 2018

SUBJECT: DISTRIBUTED SYSTEMS [ICT3201]

REVISED CREDIT SYSTEM
(13 /06/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. What are the key design goals of Distributed Systems? Explain suitable solutions to achieve the goals mentioned . **5**

1B. Compare and contrast the following with suitable examples:
i. Centralized and distributed mutual exclusion algorithm
ii. URI and URN **3**

1C. What kind of consistency would be most appropriate for each of the following applications? Justify your answer.
i. An electronic stock market application
ii. A personal mailbox for a mobile user, implemented as part of a wide-area distributed database **2**

2A. Explain with a suitable diagram the generic distributed file service architecture. **5**

2B. Consider a simple server that carries out client requests without accessing other servers. Explain is it possible to set a limit on the time taken by such a server to respond to a client request. What would need to be done to make the server able to execute requests within a bounded time? **3**

2C. List 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. Suggest how the components can be made to tolerate one another's failures. **2**

3A. Explain with suitable diagram the main functional components of a remote procedure call model. Also, discuss the choices for RPC invocation semantics. **5**

3B. What is distributed garbage collection? Explain reference counting technique with an example. **3**

3C. Compare and contrast the Lamports logical clock and vector clock **2**

4A. Explain the following:
i. External data marshalling
ii. Characteristics of event based systems
iii. DNS queries **5**

4B. Explain with examples the causal consistency and monotonic read consistency models . **3**

4C. Consider two communication services for use in asynchronous distributed systems. In service A, messages may be lost, duplicated or delayed and checksums apply only to headers. In service B, messages may be lost. delayed or delivered too fast for the recipient to handle them, but those that are delivered arrive order and with the correct contents. Consider a pair of processes X and Y that use the communication service B to communicate with one another. Suppose that X is a client and Y a server and that an invocation consists of a request message from X to Y (that carries out the request) followed by a reply message from Y to X. Describe the classes of failure that may be exhibited by an invocation. **2**

5A. Explain with suitable illustrations primary based and replicated write consistency protocols, **5**

5B. With suitable example BULLYs election algorithm for distributed system. Also, list the short comings of the same. **3**

5C. The host computers used in peer-to-peer systems are often simply desktop computers in users' offices or homes. What are the implications of this for the availability and security of any shared data objects that they hold and to what extent can any weaknesses be overcome through the use of replication? **2**