Total No. of Questions : 8]

SEAT No. :

P6638

[Total No. of Pages : 3

[6181]-202
B.E. (Information Technology)
DISTRIBUTED SYSTEMS
(2019 Pattern) (Semester - VIII) (414450)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Why is computer clock synchronization necessary? Describe the design requirements for a system to synchronize the clocks in a distributed system. **[8]**

b) What is NTP? With the help of a diagram, describe how NTP works. **[9]**

OR

Q2) a) Why is the Berkeley algorithm used? Describe how it works using pseudocode. **[8]**

b) What is MPI? Describe the point-to-point communication in MPI with suitable diagram. **[9]**

Explain in brief, the following send operations in MPI :

i) *MPI_Ssend*

ii) *MPI_Bsend,*

iii) *MPI_Rsend*

iv) *MPI_Isend*

P.T.O.

Q3) a) What are the key issues in Replica Management? Explain the following with respect to content replication and placement with suitable diagram. **[9]**

i) Permanent Replicas

ii) Server-Initiated Replicas

iii) Client-Initiated Replicas

b) What is a primary-based protocol in a consistency protocol? Explain the working of primary-backup protocol with suitable diagram. **[9]**

OR

Q4) a) What are the requirements of dependable systems with respect to fault tolerance? How RPC handles the communication failure in the presence of : **[9]**

i) The client is unable to locate the server.

ii) The request message from the client to the server is lost.

b) What is the distribution commit problem? Discuss how this problem is solved using the two-phase commit protocol with suitable diagram. **[9]**

Q5) a) What are the key design issues for distributed file systems? Describe the requirements for distributed file systems. **[8]**

b) Why Quality of Service Management is important in Distributed Multimedia Systems? Describe QoS manager responsibilities using suitable graphical representation. **[9]**

OR

Q6) a) Describe, using the appropriate diagram, how a web service is implemented in horizontal distribution using web server clusters. **[8]**

b) Explain in brief, the two places of client-side web caching? Explain cooperative caching with suitable diagram. **[9]**

Q7) a) What is Service Oriented Architecture (SOA)? Explain the various SOA components. How does it differ from traditional software architecture? **[9]**

b) Explain in brief, the key features of Zabbix. **[9]**

OR

Q8) a) Explain in brief, the key features of Prometheus including data model, query language, or alerting rules. **[9]**

b) Provide an overview of Mach and CHORUS microkernels. How are memory management techniques used to avoid physical copying of data in Mach and CHORUS? **[9]**