

Paper-2 Marking Scheme
(3 Hours)

Total Marks: 80

Note:

1. Question No.1 is Compulsory.
2. Attempt any 3 questions out of the remaining Questions.
3. Make suitable Assumptions whenever necessary.
4. All question carry equal marks.

Q 1.	a) Define Distributed Database System? List advantages of it? Solution: ▪ Definition of Distributed DBMS (1 mark) ▪ List any 4 advantage (4 mark)	[5]				
	b) Explain Distributed Database Design Issues? Solution: ▪ Distributed Database Design (1 mark) ▪ List any 4 issues (4 mark)	[5]				
	c) Compare homogenous and heterogeneous databases? Solution: ▪ Any 5 comparison points (5 mark)	[5]				
	d) List applications of XML. Solution: ▪ What is XML (1 mark) ▪ List any 4 Application (4 mark)	[5]				
Q 2.	a) Draw and Explain Model of Transaction Management in DDB. Solution: ▪ Diagram of Model of Transaction Management (2 mark) ▪ Roles of Transaction Manager (4 mark) ▪ Roles of Transaction Coordinator (4 mark)	[10]				
	b) Describe clearly Two Phase Commit (2PC) Protocol. Solution: ▪ What is 2PC, Problems in 2PC (2 mark) ▪ State Transition Diagram of coordinator and participant (2 mark) ▪ Explanation of State Transition Diagram (3 mark) ▪ 2PC Termination (3 mark)	[10]				
Q 3.	a) Explain any one Timestamp Based Concurrency Control Mechanisms in DDB. Solution: ▪ Explanation of basic Timestamp Based Concurrency Control technique (3 mark) ▪ Any 1 Timestamp Based Concurrency Control technique in DDB (7 mark)	[10]				
	b) Explain types of fragmentation? Perform Primary Horizontal Fragmentation of relation Department looking for departments located at different site and accesses department information according to funds one site access $\leq 30,0000$ and other site access $> 30,0000$.	[10]				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 10%;">DNo</th> <th style="width: 10%;">DName</th> <th style="width: 10%;">Funds</th> <th style="width: 10%;">Loc</th> </tr> </thead> </table>	DNo	DName	Funds	Loc	
DNo	DName	Funds	Loc			

D001	HR	235,000	NY
D002	Development	410,000	NY
D003	Testing	300,000	UK
D004	Maintenance	350,000	UK

Solution:

- Types of horizontal fragmentation (4 mark)
 - Primary horizontal fragmentation (4 marks)
- Application:** Access department information according to funds one site access $\leq 30,000$ and other site access $> 30,000$.

- **Fragment F1:** Create table Dept1 as (Select * from department where Funds $\leq 30,000$;

DNo	DName	Funds	Loc
D001	HR	235,000	NY
D003	Testing	300,000	UK

- **Fragment F2:** Create table Dept2 as (Select * from department where Funds $> 30,000$;

DNo	DName	Funds	Loc
D002	Development	410,000	NY
D004	Maintenance	350,000	UK

- Correctness criteria (2 mark)
 - **Completeness:** The primary Horizontal fragment is complete as each tuple of original relation can be found in the fragments F1, F2.
 - **Reconstruction:** Here Reconstruction is possible as union of F1, F2 will give back the original relation.
 - **Disjointness:** Here in each F1, F2 the tuples are identical and not repeated. Hence it is disjoint too.

- Q 4. a) University Database contains information about the course and the Professors who teach the courses in each semester. Each course must also have information about the number of student enrolled, room no., date and time (when and where the course is conducted)
- i. Create an XML Schema (.xsd) for above XML documents

Solution: (8Marks)

```

i) <?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="University">
<xs:complexType>
<xs:sequence>
<xs:element name="Course">
<xs:complexType>
<xs:sequence>
<xs:element name="Cno" type="xs:string"/>
<xs:element name="Cname" type="xs:string"/>
<xs:element name="CTime" type="xs:Time"/>
<xs:element name="CDate" type="xs:Date"/>
<xs:element name="CRoom" type="xs:Integer"/>
<xs:element name="NoofStud" type="xs:Integer"/>

```

[10]

	<pre> <xs:element name="Professor"> <xs:complexType> <xs:sequence> <xs:element name="SID" type="xs:string"/> <xs:element name="Name" type="xs:string"/> </xs:sequence> </xs:complexType> </xs:element> </xs:sequence> </xs:complexType> </xs:element> </xs:sequence> </xs:complexType> </xs:element> </xs:sequence> </xs:complexType> </xs:element> </xs:schema> </pre> <p>b) Write XQuery for the following: Retrieve Course name which was conducted on 25/02/19 at 11.15 a.m. (2 marks) For \$x in document("University.Xml"/University/Course) Where \$x/CDate="25/02/2019" and Ctime="11.15 a.m." Order by \$x/Cname Return \$x/Cname</p>	
	<p>c) What are the various kinds of transparencies in distributed database design? Explain each with the help of an example.</p> <p>Solution:</p> <ul style="list-style-type: none"> ▪ Transparency in distributed Database (2 mark) ▪ 4 types of transparency (4 mark) ▪ 5 types of data distribution transparency (4 mark) 	[10]
Q 5.	<p>a) Explain Phases in Distributed Query Processing in Distributed Database?</p> <p>Solution:</p> <ul style="list-style-type: none"> ▪ Diagram of Phases in Distributed Query Processing (2 mark) ▪ Explanation of 4 Phases (2*4 mark) 	[10]
	<p>b) Explain Wait Die and Wound Wait Method with the help of an example?</p> <p>Solution:</p> <ul style="list-style-type: none"> ▪ Deadlock in Distributed Database (1 mark) ▪ Distributed Deadlock prevention (1 mark) ▪ Wait-Die technique with example (4 mark) ▪ Wound-wait technique with example (4 marks) 	[10]
Q 6.	<p>a) Explain Distributed Database Architecture with neat diagram.</p> <p>Solution:</p> <ul style="list-style-type: none"> ▪ Diagram of any 1 Distributed Database Architecture (2 mark) ▪ Explanation of Distributed Database Architecture (8 mark) 	[10]
	<p>b) List and Explain anomalies of Concurrency Control in distributed system?</p> <p>Solution:</p> <ul style="list-style-type: none"> ▪ Goal of Concurrency Control (2 mark) ▪ Any 4 Concurrency Control Anomalies (2*4 mark) 	[10]