C6-R3: ADVANCED DATABASE MANAGEMENT SYSTEMS

NOTE:

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) What is a deductive database? What do you understand by the terms EDB & IDB with reference to deductive database?

b) Compare Object oriented approach vis a vis RDBMS with respect to referential integrity & normalization.

c) What is fragmentation independence and replication independence with respect to a distributed database?

d) Let f(x,y) be an arbitrary well formed formula WFF with free variables x and y. Which of the following are true statements?

i) Exists x Exists y (f(x,y)) = Exists y Exists x (f(x,y))

ii) Forall x (f(x,y)) = Not Exists x (not f(x,y))

iii) Exists x Forall y (f(x,y)) = Forall y Exists x (f(x,y))

iv) Forall x Forall y (f(x,y)) = Forall y Forall x (f(x,y))

e) What do you understand by the term ETL (Extract, Transform and Load) with respect to data mining & data warehousing.

f) How does a data cube allow one to view aggregated data from a number of perspectives?

g) How is a Native XML database different from relational database? Explain briefly Native XML database.

(7x4)

2.

a) What do you understand by the term Serializability?

b) What is Two Phase Locking? Can Serializability always be ensured in a system that supports 2 Phase Locking Protocol? Explain.

c) Let Transaction T1,T2 & T3 be as follows :

(T1) A := A + 1 ;
(T2) A := A * 3 ;
(T3) A := A ** 2 ;

Suppose that these transactions are allowed to run concurrently. If A has initial value zero, how many possible correct results are there? Enumerate them.

(6+6+6)

3.

a) What are the coupling modes of ECA (Event-Condition-Action) rules?

b) What are the four classes of declarative constraints supported by a SQL-1999 compliant system?

c) Suppose we have defined the following table schemas:

invoice(invoice_number,customer,date,item_total)
detail(invoice_number,item_id,quantity)
goods(item_id,price,quantity)

Write the declarative constraints for these tables.

(6+6+6)

4.

a) What do you understand by Association Rules? Discuss Apriori Algorithm.

b) A transactional data with 5 transactions in a supermarket is given below.

TID	List of items (item_IDs)
1	Beer(I1), Diaper(I2), Baby Powder(I3), Bread(I4), Umbrella(I5)
2	Diaper(I2), Baby Powder(I3)
3	Beer(I1), Diaper(I2), Milk(I6)
4	Diaper(I2), Beer(I1), Detergent(I7)
5	Beer(I1), Milk(I6), Coca Cola (I8)

with Minimum Support of 40%, Confidence = 70%. Find the association rules.

(8+10)

5.

a) Discuss image indexing and retrieval based on texture.

b) How do we find the value of a specified cell say row 3 and Column 5 on the screen by a mouse using a Quadtree?

c) Discuss null value operations with respect to relational algebra.

(6+6+6)

6.

a) Convert the following SQL Constructs to Datalog.

i) **SELECT** Y **FROM** Relation1

ii) **SELECT** Y **FROM** Relation1 **WHERE** X = c

iii) **SELECT** X,Y **FROM** Relation1 **UNION SELECT** X,Y **FROM** Relation2

iv) **SELECT** Relation1.X,Relation2.Y **FROM** Relation1,Relation2 **WHERE** Relation1.X=Relation2.X **AND** Relation1.Y=Relation2.Y

v) **SELECT** X,Y FROM Relation1 **WHERE** X,Y **NOT IN** (**SELECT** * **FROM** Relation2)

vi) **SELECT** * **FROM** Relation1, Relation2

b) How are Datalog Programs evaluated? Discuss both recursive and non-recursive Datalog Programs.

(9+9)

7.

a) What do you understand by Join Dependency? Suppose we have an all key relation SPJ as follows:

SPJ:

S#	**P#**	**J#**
S1	P1	J2
S1	P2	J1
S2	P1	J1
S1	P1	J1

Show the non loss decomposion of SPJ and how the original relation can be recovered from its projection.

b) Using the **supplier S - parts P -projects J** database as given below, write a program with embedded SQL statements to list all supplier records, in supplier number order. Each supplier record should be immediately followed in the listing by all project records for projects supplied by that supplier in project number order.

S(S#,SNAME,STATUS,CITY)
P(P#,PNAME,COLOR,WEIGHT)
J(J#,JNAME,CITY)
SPJ(S#,P#,J#,QTY)

(8+10)