MCA (Revised)

Term-End Examination

December, 2009

MCS-023 : DATABASE MANAGEMENT SYSTEMS

09914

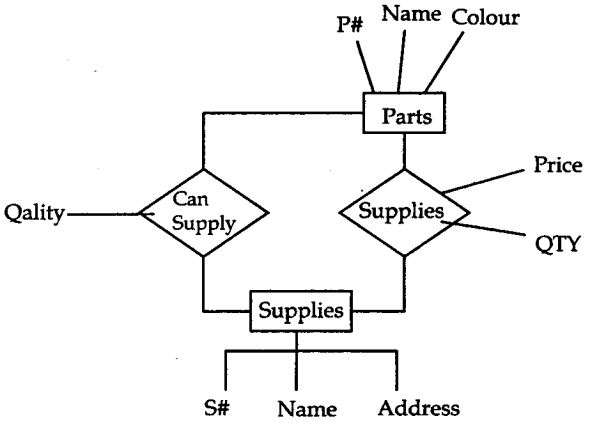
Time : 3 hours *Maximum Marks :100*

(Weightage 75%)

Note : *Question number **1** is **compulsory.** Attempt any **three** from the rest.*

1. (a) State BCNF what are the anomalies associated with a relation that is not in BCNF ? Given a relation R (Supplier, City, Part) with functional dependencies supplier $\rightarrow$ city and. City, Part $\rightarrow$ Supplier. Is R in BCNF ? If not decompose R into BCNF relations. **1+3+4**

(b) Map the following E-R diagram the most suitable relational database scheme. For each relation, choose an appropriate name and list corresponding attributes, undertaking the primary key. For each relation, also identify the foreign keys. **4+2+2**



(c) Given the relational schemes : 8

Enroll (S#, C#, Section) - S# represents Student number

Teach (Prof, C#, Section) - C# represent course number

Advise (Prof, S#) - Prof is theirs advisor of S#

Prereg (C#, Pre, C#) Pre - C# is a prerequisites course

Grades (S#, C#, Grade, year)

Student (S#, Sname)

Write the following queries using SQL.

(i) List all students taxing courses with student Ram.

(ii) List all students taxing at least one course then their advisor teaches.

(iii) List those professors who teach atleast one course.

(iv) List the courses that student Anil has enrolled.

(d) What is normalization ? What is its purpose ? 4

(e) Discuss the effect of a commit operation with the help of an example. 4

(f) Identify a major weakness of a client/server architecture and suggest a way to deal with this problem. 4

(g) Define Data Fragmentalism. Identify three objectives of data fragmentation in Distributed Databases. 4

2. (a) Express the queries listed in Q_1 (iii) using Relational Algebra. 8

(b) For the relations R_1 and R_2 given below, perform the following operation and their the resulting relations : 6

(i) Find the projection of R_2 on the attributes θ (B,C).

(ii) Find the natural join of R_1 and R_2 on the common attributes.

(iii) Divide R_1 by the relation that is obtained by first selecting those tuples of R_2 where the value of B is either b_1 or b_2 and then projecting R_2 on the attributes (C,D).

R_1

A	B	C	D
a_1	b_2	c_2	d_2
a_2	b_1	c_1	d_2
a_1	b_1	c_2	d_1
a_2	b_1	c_2	d_2
a_1	b_2	c_1	d_2
a_2	b_1	c_1	d_2
a_1	b_2	c_2	d_2

R_2

B	C	D
b_1	c_1	d_1
b_2	c_1	d_2
b_3	c_2	d_1
b_1	c_1	d_2
b_2	c_2	d_2

(c) Explain database recovery using system log with the help of an example. 6

3. Differentiate between the following with examples : 20

(a) Candidate Key, Primary Key and Foreign Key.

(b) DDL and DML

(c) Weak entity and strong entity

(d) Wait die and wound wait protocols.

(e) Sequential and Indexed Sequential file organization.

4. (a) Explain any two integrity constraints with the help of an example. 6

(b) Discuss two phase locking protocol. Differentiate between basic and strict two phase locking. 4+4

(c) Under what situations B-trees indexes are preferable over Binary Search Tree Indexes. 6

5. (a) What are the advantages and disadvantages of distributed databases ? 6

(b) Define Third normal form. How does it differ from Second Normal Form ? 4

(c) What is a 'view' in databases ? What an its advantages ? 5

(d) What are the three levels of database architecture ? How are they related to the concept of data independence ? 5

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