Printed Pages : 4 **MCA-304**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1432 Roll No. | | | | | | | | | | |

M.C.A.

(SEM. III) EXAMINATION, 2008-09

DATA BASE MANAGEMENT SYSTEM

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

Note : *(i) Attempt all questions.*

(ii) Each question carries equal marks.

1 Attempt any four parts of the following : **5×4=20**

(a) Define weak entity set. What is the use of weak entity set ? How are they mapped into relational tables ?

(b) What do you mean by database management system ? Explain its advantages / disadvantages over file system.

(c) Give the roles of database administrator and data base designer. Can they be same entity ?

(d) What is the role of an attribute in E-R model ? List various types of attributes.

(e) Define the term data model. Also give at least three data models and briefly define them.

(f) Define the following terms :

(i) Super key

(ii) DML

(iii) Aggregation

(iv) Query Processor

(v) Schema and Instance.

2 Attempt any four parts of the following : **5×4=20**

(a) Explain various integrity rules in relational data model.

(b) Define the terms relation, cardinality and relation degree with an example.

(c) Show how you may specify the following relational algebra operations in both tuple and domain calculus :

(i) $\sigma_A = C(R(A, B, D))$

(ii) $R(A, B, C) - S(A, B, C)$

(d) What is meant by cursors ? Explain with suitable example.

(e) Explain the advantages of triggers with suitable examples.

(f) What are different aggregate functions used in SQL ? Explain at least two with the help of examples.

3 Attempt any four parts of the following : **5×4=20**

(a) Given the relation $R(ABCDEF)$ with the set

$$H = \{A \rightarrow CE, B \rightarrow D, C \rightarrow ADE, BD \rightarrow F\}.$$

Find the closure of BCD.

(b) What is the functional dependency ? List all functional dependencies satisfied by R given below :

A	B	C
a_1	b_1	c_1
a_1	b_1	c_2
a_2	b_1	c_1
a_2	b_1	c_3

(c) Explain why 4 NF is a normal form more desirable than is BCNF.

(d) Compute the closure of the following set F for relation schema $R = (A, B, C, D, E)$

$F = \{A \rightarrow BC,\ CD \rightarrow E,\ B \rightarrow D,\ E \rightarrow A\}$.

Also list the candidate keys of R.

(e) Discuss the advantage and disadvantage of representing hierarchical structured data from the real world as unnormalized relation.

(f) For relation schema $R(A, B, C, D, E)$ with functional dependencies

$F = \{A \rightarrow B,\ BC \rightarrow E, ED \rightarrow A\}$, check whether R is in 3NF ? Also find that whether it is in BCNF ?

4 Attempt any two parts of the following : **10×2=20**

(a) Explain the difference between conflict serializable schedule and view serializable schedule with suitable examples.

(b) What do you mean by a transaction ? Write ACID properties of a transaction. Also give the state diagram of a transaction.

(c) Explain following protocols :

(i) Read before write protocol **4**

(ii) Read only protocol **3**

(iii) Write only protocol. **3**

5 Attempt any two parts of the following : **10×2=20**

(a) What do you mean by time stamps ? Explain the salient features of time stamp ordering protocol. What do you mean by multiversion scheme ? Explain what are W-Time stamp and R-time stamp of N^{th} version of data object.

(b) What do you mean by concurrency control ? How is it performed in distributed database ? Discuss various validation techniques.

(c) What is the role of data fragmentation in distributed database ? Explain horizontal, vertical and mixed fragmentation with an example.

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Printed Pages : 4 MCA-234

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1408 Roll No.

M.C.A.

(SEM. III) EXAMINATION, 2007-08

DATABASE MANAGEMENT SYSTEM

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

Note : Attempt all questions.

1 Attempt any **four** of the following parts : **5×4=20**

(a) Discuss the main characteristics of the database approach and how it differs from traditional file system.

(b) What are the responsibilities of the DBA and the database designers?

(c) What is the logical data independance and why is it important? Explain.

(d) Discuss various key-constraints with example.

(e) Explain the data definition language (DDL) and data manipulation language (DML).

(f) What is a participation role? When is it necessary to use role names in the description of relationship types?

Attempt any **four** parts : **5×4=20**

(a) Discuss the characteristics of relations that make them different from ordinary tables and files.

(b) Define the term relation schema and relation state with an example.

(c) Explain the following relational algebra operations with their notations by suitable example :

(i) SELECT

(ii) UNION

(iii) DIFFERENCE

(iv) NATURAL JOIN.

(d) Show how you may specify the following relational algebra operations in both triple and domain relational calculus:

(i) $\pi_{\langle A,B\rangle}\left(R(A, B, C)\right)$

(ii) $R(A, B, C) \times \rho\,(A, B, C)$

(e) Consider the following relational schemes. An employee can work in more than one department; the pct-time field of the works relation shows the percentage of time that a given employee works in a given department.

EMP (eid: integer, ename; string, age; integer, salary; re

Works (eid:integer, did:integer, pct-time:integer)

Dept (did: integer; budget: real, managerid: integer)

Write following queries in SQL:

(i) Print the names and age of the employee who works in both hardware dept. and software dept.

(ii) Find the enames of managers who manage the departments with the largest budget.

(f) Define triggers? How are they implemented in Oracle? Explain with example.

3 Attempt any **two** parts : **10×2=20**

(a) (i) Discuss insertion, deletion and modification anomalies. Why are they considered bad? Explain. **4**

(ii) Consider a relation R (A,B,C,D,E) with the following dependencies: **6**

AB → C, CD → E, DE → B

Is AB a candidate key of this relation? If not is ABD? Explain.

(b) Suppose that we have the following three types in a legal instance of a relation scheme, S with three attributes. ABC (listed in order): (1,2,3), (4,2,3) and (5,3,3). **5+5**

(i) Which of the following dependencies can you infer does not hold over scheme S?

(a) $A \rightarrow B$

(b) $BC \rightarrow A$

(c) $B \rightarrow C$

(ii) Can you identify any dependenciew that hold over S?

(c) Prove that an MVD $X \rightarrow\rightarrow Y$ over a relation R can be expressed as the join dependency $\infty\{XY, X(R=Y)\}$ with example.

4 Attempt any **two** parts : **10×2=20**

(a) (i) Define the term : transaction states, atomicity. **5**

(ii) What is the system log used for? What are the typical kinds of records in a system log? Explain. **5**

(b) What is a serial schedule? What is a serializable schedule? Why is a serial schedule considered correct? Explain.

(c) Define the violations caused by each of the following :
dirty read, non-repeatable read, and phantonus.

Attempt any **two** parts : **10×2=20**

(a) Time stamping protocols for concurrency control.

(b) Multi version schemes.

(c) Multiple granularity.

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1432 Roll No.

M.C.A.

(SEM. III) EXAMINATION, 2007-08

DATABASE MANAGEMENT SYSTEM

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

Note : (1) Attempt ***all*** *questions.*

(2) Each question carry ***equal*** *marks.*

1 Attempt any **four** parts of the following : **5×4=20**

(a) Explain the difference between a file oriented system and a data base oriented system.

(b) Construct an E-R model for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any no. of recorded incidents.

(c) List all the database users. Explain sophisticated and specialized users.

(d) What is meant by a recursive relation type ? Explain with an example.

(e) Describe various types of data model ? How these differ from each other; explain in brief.

(f) A weak entity set can always be made into a strong entity set by adding to its attributes of its identifying entity set. outline what sort of redundancy will result if we do so ?

2 Attempt any **four** parts of the following : **5×4=20**

(a) Draw the basic architecture of DBMS system (oracle 8i).

(b) Employee / emp_id, emp_name, emp_street, emp_city)
works (emp_id, company_id, salary)
located in (company_code, company_name, company_city)
Write queries in relational algebra :

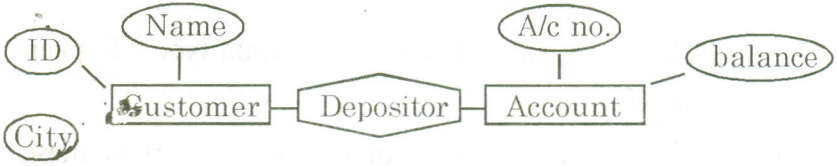
(1) Find the names of all employees who work for a company located at "Delhi".

(2) Find the names of the employees who work for the company located at city in which they live.

(3) Find the names of the employee who work in company "TCS".

(c) What is a foreign key constraint ? Why are such constraints important ?

(d) Design relational database corresponding to E-R diagram :



(e) Which commands are DDL parts of SQL ? Write their syntax

(f) Explain by example following operations : join, union, minus, update, insert.

Attempt any **four** parts of the following : **5×4=20**

(a) What are the design goals of a good relational database ?

(b) Prove with suitable example that BCNF is stronger than 3NF.

(c) Consider the scheme $R = (A, B, C, D, E)$. Suppose following FD's hold :

$$F = \{E \rightarrow A,\ CD \rightarrow E,\ A \rightarrow BC,\ B \rightarrow D\}$$

State whether following decomposition of R are lossless join decomposition or not. Justify your answer :

(1) $\{(A, B, C), (A, D, E)\}$

(2) $\{(A, B, C), (C, D, E)\}$

(d) What do you mean by Armstrong's axioms for finding FDs ?

(e) Consider two set of functional dependencies :

$$F_1 = \{A \rightarrow C,\ AC \rightarrow D,\ E \rightarrow AD,\ E \rightarrow H\}$$

$$F_2 = \{A \rightarrow CD,\ E \rightarrow AH\}$$

check whether they are equivalent.

(f) Prove that if in a relation schema, the no. of attributes in a primary key is one, the schema will be at least in 2NF.

4 Attempt any **two** of the following : **10×2=20**

(a) What do you mean by a schedule ? When is a schedule called serializable ? What are conflict serializable schedules ? Show whether the following schedules are conflict equivalent or not. Justify your statement :

Schedule 1

T_1	T_2
Read (A)	
Write (A)	
	Read (A)
	Write (A)

Schedule 2

T_1	T_2
	Read (A)
Read (A)	
	Write (A)
Write (A)	

(b) Explain how the following differ :
Fragmentation, Replication transparency and location transparency.

(c) Explain the reasons why recovery of interactive transaction are more difficult than recovery of batch transactions.

5 Attempt any **two** parts of the following : **10×2=20**

(a) What are the different locking techniques for concurrency control ?

(b) What is time stamp ? List all the time stamp based protocols, check whether it is cascadeless and whether it is recoverable.

(c) Write short notes on the following :

(1) Estimation of cost and optimization of tuple transfer for join in distributed database.

(2) Multiple granularity and multiversion schemes.

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PAPER ID : 1432 Roll No. | | | | | | | | | | |

MCA

THIRD SEMESTER EXAMINATION, 2006-07

DATABASE MANAGEMENT SYSTEM

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt ALL questions.*

(ii) All questions carry equal marks.

(iii) Be precise in your answer.

1. Attempt *any four* parts of the following : (5x4=20)

(a) How is it possible to get more information from the same amount of data by using a database approach as opposed to a file approach ?

(b) Define redundancy. Can data redundancy be completely eliminated when database approach is used ?

(c) Draw E.R. diagram for departmental store, after determining the entities of interest and the relationship that exist between those entities. Also construct a tabular representation of the entities and the relationship. Are there any attributes in each entity set that would uniquely identify an instance of the entity set ?

(d) Explain the distinction between total and partial constraints with suitable example.

(e) How representation of association and relationship in network and hierarchical model can be different ?

(f) Define the concept of aggregation with at least two examples where these concept is useful.

2. Attempt *any four* parts of the following : (5x4=20)

(a) In what sense relational calculus differ from relational algebra and in what sense they are similar ?

(b) What is view ? List two reasons why we may choose to define a view.

(c) Let R = (A, B, C) and r_1, r_2 both be relations on schema R. Give the expression in the domain relational calculus for the following :

(i) $\pi A(r_1)$

(ii) $\pi_{A,B}(r_1) \bowtie \pi_{B,C}(r_2)$

(iii) $r_1 - r_2$

(d) Consider the given insurance data base, where primary keys are underlined construct the given SQL - queries for the relational database.

person (driver-id #, name, address)
car (license, model, year)
accident (report-number, date, location)
owns (driver-id #, license)
participated (driver-id#, report-number, damage amount)

(i) Add a new accident to the database; assume any value for required attributes.

(ii) Update the damage amount for the car with licence number "AABB2000" in the accident with report number "AR 2197" to $ 3000.

(e) For the relation P and Q as given. Perform the following operation and show the resulting relation :

P

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_3	b_1	c_2	d_1
a_1	b_2	c_2	d_2
a_2	b_1	c_1	d_2
a_1	b_3	c_2	d_2

Q

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

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

(ii) Devide P by the relation that is obtained by first selecting those tuples of Q where the value of B is either b_1 or b_2 and then projection Q on the attributes (C, D).

(f) What is view ? Explain the advantage of cursor in SQL ?

Attempt *any two* parts of the following : **(10x2=20)**

(a) Given the relation R {ABCDE} with FDs - {A → BCDE, B → ACDE, C → ABDE}.

Give the lossless decomposition of R.

(b) Explain why 4NF is more desirable than BCNF.

(c) Using the knowledge of college environment, determine functional dependencies that exists in the following table. After these have been determined, convert this table to an equivalent collection to tables that are in 3NF.

Student [(Student Number, Student Name, Number credits, Advisor Number, Advisor Name, Dept. Number, Dept. Name, (Course Number, Course description, Course term, Grade)].

4. Attempt *any two* parts of the following : **(10x2=20)**

(a) Explain two -phase commit protocol. How is it performed show with example ?

(b) Differentiate check point mechanism with logging facility.

(c) Consider the precedence graph given in figure and check which type of serializable is it. Explain your answer.