

MCA (Revised)

Term-End Examination

June, 2009

12341

MCS-023 : DATABASE MANAGEMENT
SYSTEMS

Time : 3 hours

Maximum Marks :100

(Weightage 75%)

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

1. (a) Explain the anomalies that may occur when the two integrity rules are violated. 4
- (b) For each of the following rows, state which if any, of the integrity rules are violated when they are added to the sales-order relation given below : 5
- (i) < 014, 1/1/91, C45 >
- (ii) < 015, 1/4/90, null >
- (iii) < 016, 2/4/92, C52 >
- (iv) < 017, null, null >
- (v) < null, 1/1/91, C45 >.

Customer

C_No	Name	Address
C45	Boys	Delhi
C46	Girls	Faridabad

Sales - Order

Order_No	Date	C_No
011	1/7/85	C45
012	1/8/89	Null
013	2/5/88	C46
014	1/1/89	C45

- (c) Consider the following database scheme 6
- EMPLOYEE (EMP_NO, NAME, AGE, DEPT_NO)
- DEPARTMENT (DEPT_NO, NAME, Designation)
- EMPLOYEE_TELEPHONE (EMP_NO, DEPT_NO, EXTENSION)
- Specify the following queries using the relational algebra operators.
- (i) Retrieve details of employees who share the telephone extension 123.
 - (ii) Retrieve the names of employee who are working as Readers in mechanical engineering department having age above 40.
 - (iii) Retrieve the details of employees who are of the same age as employee E1.
 - (iv) Retrieve details of department without a professor.
- (d) Express the above queries using SQL for the 6
- same database scheme given in Q.1 (c) .

- (b) What are the problems encountered with concurrent transactions ? Explain through examples. 6
- (c) When is it useful to have replication or fragmentation of data in distributed database ? Explain. 6
5. (a) Identify the functional dependencies which hold for the following relation : 4

Brand name	Size	Price	Manufacturer
B1	S1	P1	M1
B1	S2	P2	M1
B2	S1	P3	M1
B2	S3	P4	M1
B3	S4	P5	M2
B3	S5	P6	M2

- (b) Explain how B-Tree indexes are different from Binary search tree indexes. 5
- (c) Define primary key, super key, candidate key and foreign key. 4
- (d) Explain the important components of database manager with the help of a diagram. 7

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- (e) Define 3NF, explain why the following *EMPLOYEE* relation does not satisfy 3NF. Decompose relation *EMPLOYEE* into relations which satisfies 3NF. Is the decomposition lossless ? Justify. **1+3+3+2=9**

EMPLOYEE				
EMP-NO	NAME	ADDRESS	DEPARTMENT	DEPART_MANAGER
E1	N1	A1	D1	E1
E2	N2	A2	D1	E1
E3	N1	A2	D1	E1
E4	N3	A3	D2	E9
E9	N4	A4	D2	E9

- (f) Answer the following questions :
- (i) What effect does a ROLLBACK instruction have ? **3**
 - (ii) What is data independence ? **2**
 - (iii) What are the purposes of multi-key file organisation ? **3**
 - (iv) Give two reasons for not distributing a database. **2**
2. (a) For the relation, Employee, Department and Employee_Extension perform the following operation and show the resulting relation. **8**

- (i) *Project* employee Extension ON office, Extension
- (ii) Employee *Union* < E4, 222, N4, D4 >
- (iii) *Join* Employee and Department
- (iv) *Project* Employee_Extension ON Emp_ No)
Intersect (*Project* employee ON Emp No)

Employee

Emp_No	ename	Dept_No
E1	N1	D1
E2	N1	D1
E3	N2	D2
E5	N3	D3

Employee - Extension

Emp_No	Office	Ext.
E1	01	EXT 1
E1	02	EXT 2
E2	03	EXT 3
E3	04	EXT 4
E5	04	EXT 4

Department

Dept_No	dname	Manager
D1	DN1	E1
D2	DN2	E2
D3	DN3	E5

- (b) Explain the two schemes to avoid deadlock through examples. 6
- (c) Explain the ACID properties with the help of an example. 6
3. Differentiate between the followings : 20
- (a) Serial Schedule and serializable schedule
- (b) Physical data independence and logical data independence
- (c) Global and local transaction
- (d) Relational Algebra and SQL
- (e) Generalization and Specialization.
4. (a) Consider the following statement :
 "Customer No C1 Ram Narayan has placed order number N1 for seven pairs of shoes, product No P_2 at Rs 1000/- each. The order was placed through Shyam Narayan, Sales person S1 through the Delhi office, on 15/5/2000. Each order may only be for a single product type and the price is negotiable on an order by order basis. A sales person may be assigned to a specific sales office, but not to specific customers. Also, some salespersons work independently and deal directly with headoffice, rather than through a sales office".
 Identify the following :
- (i) Entities with their attributes 4
- (ii) Relationships among entitles 4