MCA (Revised)

Term-End Examination

December, 2011 00520

MCS-023 : DATABASE MANAGEMENT SYSTEMS

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

Note : *Question No.* ***1*** *is* ***compulsory.*** *Attempt* ***any three*** *questions from the rest.*

1. (a) Draw the block diagram to show the components of Database manager. **5**

(b) Compare the following : **5**

(i) Filebase system and DBMS

(ii) Logical and Physical Levels of DBMS

(c) Define Super key, Alternate key, Primary key, with the help of an example. **5**

(d) Using operators of relational algebra/SQL, perform Queries for the relations given below : **5**

Supplier (S#, S_name, status, city)

Parts (P#, P_name, color, weight)

Supply (S#, P#, Quantity)

(i) Find the part code (P#) of the parts which are supplied by a supplier.

(ii) Find the part name of all the parts that are supplied by suppliers who are in "Mumbai"

(e) Justify "Any relation which is in BCNF is in 3NF but converse is not true". 5

(f) In SQL, what is the need of VIEW mechanism ? How views differs from tables ? Give the syntax required to create a view. 6

(g) Differentiate between serial schedule and serializable schedule. 3

(h) How Distributed DBMS differs from centralized DBMS ? Give two advantages of Distributed DBMS over the centralized DBMS. 6

2. (a) List the data models, used to structure the data in Database systems. 3

(b) For the relations given below : 6

R_1 :

X	Y
A_1	B_1
A_7	B_7
A_2	B_2
A_4	B_4

R_2 :

A	B
A_1	B_1
A_2	B_2
A_3	B_3
A_4	B_4

R_3 :

B
B_1
B_2

Find $R_1 \div R_3$, $R_1 \cap R_2$, $R_1 \cup R_2$, $R_1 \times R_2$

(c) Differentiate between following : 5

(i) Weak Entity and Strong Entity

(ii) ER Diagram and flowchart

(d) Draw ER diagram for the following "A teacher can teach many courses. A student can enrol in many courses. A course may be a part of one or many programmes. A teacher can be mentor of many students, however a student can have only one mentor." 6

3. (a) What is foreign key ? Give an example to explain its use in data base design. 3

(b) Refer to the relation schemas given below and answer the questions asked after schema description. 5

Suppliers (S.no, Sname, city)

Parts (P.no, Pname, colour, city)

Projects (Proj no., Projname, city)

Sup-par-proj (S.no, P.no., Proj no., Quantity)

(i) What are the entity integrity constraints in the relations ?

(ii) What are the referential integrity constraints in the relations ?

(c) For the relation given below (in the tabular format) identify which of the functional dependencies hold true. 5

J	K	L	M
x	1	2	5
x	1	2	6
y	1	3	7
y	1	3	8
z	2	4	9
P	4	7	5

(i) J, K $\rightarrow$ L

(ii) J $\rightarrow$ K

(iii) J, K $\rightarrow$ L, M

(iv) J, K $\rightarrow$ M

(v) L $\rightarrow$ K

(d) An unordered student file has 20,000 records stored on a disk having the block size as 1 k. Assume that each student record is of 100 bytes, the secondary index field is of 8 bytes and block pointer is also of 8 bytes. Find how many blocks accesses on an average may be saved on using secondary index on enrolment. 7

4. (a) Why do you normalize a database ? Explain. 5

(b) What do you mean by the term Transaction ? Briefly describe the ACID properties of the transaction ? Classify that which problem is caused by the violation of which property of transaction in an concurrent environment ? 8

(c) Let the transaction T_1, T_2 and T_3 be defined to perform following operations : 7

T_1	T_2	T_3
S-lock A	-	-
-	X-lock B	-
-	S-lock C	-
-	-	X-lock C
-	S-lock A	-
S-lock B	-	-
S-lock A	-	-
-	-	S-lock A

Draw suitable precedence graph for the given locking requests and find the transactions are deadlocked or not.

5. (a) Explain the following with suitable example/diagram. 8

(i) Write Ahead log protocol

(ii) Log based recovery

(b) What do you mean by Database security and Database integrity ? Are the two term inter-related, if so then draw the suitable block diagram, in support of your answer. 6

(c) What are the advantages of client server computing ? How 3 tier client server architecture differs from 2 tier architecture ? 6