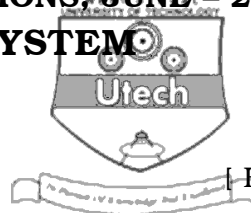


ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009
DATABASE MANAGEMENT SYSTEM
SEMESTER – 6

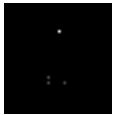


Time : 3 Hours]

[Full Marks : 70

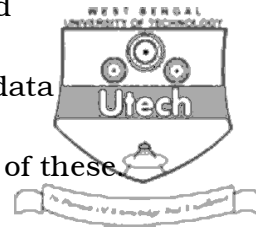
GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10
- i) Overall logical structure of a database can be expressed graphically by
- | | | |
|---------------|---------------|--|
| a) ER diagram | b) Records | |
| c) Relations | d) Hierarchy. | |
- ii) A normal form in which every determinant is a key is
- | | | |
|---------|---------|--|
| a) 2NF | b) 3NF | |
| c) BCNF | d) 4NF. | |
- iii) Which of the following levels of abstraction involves the view of data ?
- | | | |
|-------------------|---------------------|--|
| a) External level | b) Conceptual level | |
| c) Physical level | d) None of these. | |
- iv) One of the shortcomings of file system is
- | | | |
|-----------------------|----------------------|--|
| a) data availability | b) fixed records | |
| c) sequential records | d) lack of security. | |
- v) The ability to modify the internal schema without causing any change to external schema is
- | | | |
|-------------------------------|------------------------------|--|
| a) physical data independence | b) logical data independence | |
| c) external data independence | d) none of these. | |



vi) The information about data in a database is called

- a) meta data b) tera data
- c) hyper data d) none of these



vii) Which of the following features is supported in the relational database model ?

- a) Complex data types b) Multi-valued attributes
- c) Associations with multiplicities d) Generalization relationships.

viii) Four DML commands are

- CREATE, UPDATE, DELETE, SELECT
- INSERT, UPDATE, DROP, SELECT
- CREATE, ALTER, DELETE, SELECT
- INSERT, MODIFY, DELETE, SELECT
- INSERT, UPDATE, DELETE, SELECT.

ix) Given the relation schema Bank (BankID, AccountNumb, Balance, Customer)
with FDs :

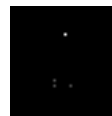
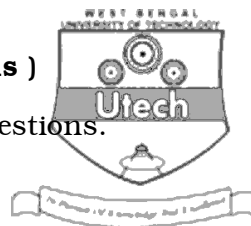
```
{ BankID, AccountNumb -> Balance; BankID, AccounNumb -> Customer;
Customer -> BankID }.
```

What is the highest normal form for the relation schema Bank ?

- a) First b) Second
- c) Third d) Boyce Codde.

x) A relation is considered to be in second normal form if it is in first normal form and it has no dependencies.

- a) referential
b) functional
c) partial key
d) transitive.

**GROUP – B****(Short Answer Type Questions)**Answer any *three* of the following questions.

3 × 5 = 15

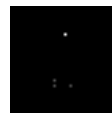
2. a) What do you mean by functional dependency ? 2
- b) What are the main characteristics of functional dependencies ? 3
3. Define BCNF. How does it differ from 3NF ? Why is it considered a stronger than 3 NF ? 1 + 2 + 2
4. What are ACID properties of a database transaction ? How are they selected to the concurrency control ? 3 + 2
5. a) What is the difference between a database and a table ? 2
- b) Why are entity integrity and referential integrity important in a database ? 3
6. a) Give an example of supertype/subtype relationship where the overlap rule applies. 3
- b) What is inheritance in generalization hierarchies ? 2

GROUP – C**(Long Answer Type Questions)**Answer any *three* of the following questions.

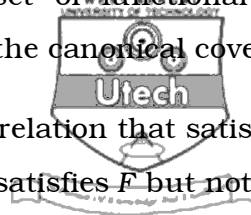
3 × 15 = 45

7. a) Given a database schema named PLANE_INFO (flight_no, date, plane, airline, from, to, miles), the functional dependency diagram is given below :

Decompose it up to Boyce-Codd Normal Form (BCNF).



- b) Consider the relation $R (A, B, C)$ and a set of functional dependencies $F = \{ A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C \}$. Compute the canonical cover for F .
- c) Given $F = \{ A \rightarrow B, B \rightarrow C \}$. Find an instance of a relation that satisfies F but does not satisfy $B \rightarrow A$. Can you find an instance that satisfies F but not $A \rightarrow C$?



6 + 6 + 3

8. a) Consider the relation schemas given below :

STUDENT (student_id, name)

ENROLLEDIN (student_id, subject_code)

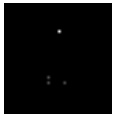
SUBJECTS (subject_code, lecturer)

Write relational algebra for the following :

- i) Who teaches CP1500 or CP3020
- ii) Who teaches at least two different subjects ?
- iii) What are the names of the students taking a subject taught by Roger ?

- b) Write down the differences between DBMS and Traditional File Processing System.
- c) Describe ACID properties in DBMS.
- d) Give an example of derived attribute. (2 + 2 + 2) + 3 + 4 + 2

9. a) Explain the roles of a database administrator (DBA).
- b) Write a row trigger (in SQL) to insert the existing values of the table SALARY (employee_no, basic_salary, commission, deduction, department) into a table named OLDINFO when the SALARY table is updated.
- c) What is aggregation ? Discuss with an example.
- d) Draw a functional dependency diagram (FD diagram) that is in 3 NF but not in BCNF. Decompose that FD diagram into BCNF. 5 + 4 + 3 + 3



10. a) Draw an *E-R* diagram for the following :

A department store operates in several cities. In a city there is one headquarters coordinating the local operations. A city may have several stores. Stores hold any amount of items. Customers place their orders for any number of items to a given store.



- b) Why we need query optimization ?
- c) Consider the relation $R (A, B, C, D, E)$ with the set of $F = \{ A \rightarrow C, B \rightarrow C, C \rightarrow D, DC \rightarrow C, CE \rightarrow A \}$. Suppose the relation has been decomposed by the relations $R1 (A, D) R2 (A, B) R3 (B, E) R4 (C, D, E), R5 (A, E)$. Is this decomposition lossy or lossless ? Justify your answer.

7 + 2 + 6

11. Write short notes on any *three* of the following :

3 × 5

- a) Vertical and Horizontal Fragmentation
- b) Armstrong's axioms
- c) Two-phase locking protocol
- d) Conflict serializability
- e) Theta (θ) join.

END