Roll No. .....

BCA–501(N)

B. C. A. (Fifth Semester)
EXAMINATION, Dec., 2013

(New Course)

Paper First

INTRODUCTION TO DBMS

Time : Three Hours] [*Maximum Marks : 75*

Note : Section A is compulsory. Attempt any *seven* questions from Section B and any *one* question from Section C.

Section—A

(Numerical/Analytical/Problematic Questions)

1. Multiple choice questions. 1 each

(a) Which one of the following is not a characteristic of metadata ?

(i) Data about data

(ii) Describes a data dictionary.

(iii) Self-describing

(iv) Includes user data

(v) Support its own structure

(b) Which phase of the data modeling process contains security receive ?

(i) Structure

(ii) Design issue

(iii) Data source

(iv) Storage issue

(v) Operational process

(c) A relation scheme is said to be in ..... form if the values in the domain of each attribute of the relation are atomic.

(i) Unnormalized

(ii) First normal

(iii) Boyce CODD N

(iv) None of these

(d) In a third normal form relation, every ..... attribute is non-transitively and fully dependent on the every candidate key.

(i) Unique

(ii) Non-prime

(iii) Prime

(iv) None of these

(e) Manager's salary details are hidden from the employee. This is :

(i) Conceptual level data hiding

(ii) Physical level data hiding

(iii) External level hiding

(iv) None of the above

2. True/False : 1 each

(i) A table can have more than one foreign keys.

(ii) In a table if a primary key is composite, then implies foreign key in that table is also composite.

(iii) If a column is a candidate key then it should be a super key.

(iv) If a relation is in 2NF means update anomaly is eliminated.

(v) A relation is in nNF implies it should be in (n-1) NF.

3. One-line answer : 1 each

(i) What is relational algebra ?

(ii) What is relation type ?

(iii) What is weak entity set ?

(iv) What is data-independence ?

(v) What is distributed database ?

(vi) What is DML ?

(vii) What is the difference between authentication and authorization ?

(viii) What is data integrity ?

Section—B 6 each

(Short Answer Type Questions)

4. What are different recovery techniques ?
5. What are different security threats ?
6. Giving examples explain clearly specialization and generalization.
7. What is Normalization ? Giving example explain clearly the 3rd normal form of database.
8. What is data model ? List the types of data model used.
9. Explain JOIN operation with example. Also explain its variations.
10. What is an index ?
11. What are different locking techniques for serializing transcation processing ?
12. Explain with example the insert, delete and update anomalies for a relation.

13. Consider the table shown below :

Staff No.	Branch No.	Branch Address
E 101	B 02	Sun Plazza, Delhi, 110001
E 101	B 04	2/3 UT, Delhi, 110111
E 122	B 02	Sun Plazza, Delhi, 110001
E 122	B 04	2/3 UT, Delhi, 110111

Name	Position	Hrs/week
Ram	Assistant	16
Ram	Assistant	9
Mohan	Assistant	14
Mohan	Assistant	10

(i) Why is the table above not in 2 NF ?

(ii) Describe the process of normalizing the data-shown in the table above to third normal form (3 NF).

(iii) Identify the primary and foreign keys in your 3 NF relations.

14. Describe B-tree. Also differentiate them from B^+ tree.

Section—C 15 each

(Long Answer Type Questions)

15. (a) A University Registrar's office maintains data about the following entities : 8

(i) Course, including number, title, credits, syllabus and prerequisites

(ii) Course offering, including course number, year, semester, section number, instructor(s), timing and classroom.

(iii) Students, including student .id, name and program.

(iv) Instructors, including identification number, name, department, title.

Further the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be apporopriately modelled construct an E-R diagram for the Registrar's office. Document all assumptions that you make about the mapping constraints ?

(b) Discuss the three-level architecture of DBMS. Explain how does it lead to data independence. 7

16. Given structure :

Project Number	Project Name	Emp. No.	Emp. Name	Job Class	Hours/ worked	Hrs/ chg.	Total Charge
13	Banking	103	Ramesh	S. A.	8	500	4000
		105	Ram	Programmer	8	300	2400
26	Telecom	115	Amit	Business Analyst	10	100	1000
		717	Shyam	Engineer	7	300	2700
39	Finance	113	Gopal	Team Leader	4	1000	4000
		120	Suresh	DBA	3	800	2400

(i) Identify the anomalies in the given structure. 4

(ii) Normalise it upto third normal form (3 NF). 5

(iii) Explain any *three* aggregate functions of SQL. with an example for each. 6

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