2018

M.Sc.

2nd Semester Examination

COMPUTER SCIENCE

PAPER—COS-201

Subject Code—26

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Advanced Database Management System

Answer *all* questions.

1. Answer the following questions (*any four*) :   4×2

   (a) What is the difference between the "Two-phase locking protocol" and "Strict two-phase locking protocol"?

   (b) What is check point in terms of DBMS?

(c) What is system log?

(d) Define dependency preservation.

(e) Let us consider a query is written using Cartesian product and natural join both and then the two queries are executed on same set of data. Which one will be executed faster?

(f) What is a foreign key? Explain with example.

(g) Differentiate between Homogeneous and Heterogeneous DBMS.

(h) What are the various types of transparencies in distributed database design?

2. Answer the following questions (any *four*) : 4×4

(a) What is data dictionary? Write its advantages.

2+2

(b) What are insertion and deletion anomalies? 4

(c) What is Relationship? What is degree of a Relation?

(d) Write ACID properties of a transaction.

(Continued)

(e) Describe temporary update problem of concurrent transactions. Give example.

(f) What is a commit point? Describe the process of rollback of a transaction.

(g) What is a binary lock? write its differences from Shared/exclusive lock.   2+2

(h) What is Data Independence? Compare between physical and logical data independence.   2+2

3. Answer the following questions (any *two*) :   2×8

(a) Suppose you are asked to design a club database system based on the following information. Each student has a unique student id, a name, and an email; each club has a unique club id, a name, a contact telephone number, and has exactly one student as its president. Each student can serve as a president in at most one of the clubs, although he/she can be the members of several clubs. Clubs organize activities and students can participate in any of them. Each activity is described by a unique activity id, a place, a date, a time and those clubs that organize it. If an activity is organized by more

than one club, different clubs might contribute different activity fees.

(i) Find all entities of the above system with corresponding attributes. ⌣

(ii) Identify the relationship among entities. 2

(iii) Construct an ER Diagram. 3

(b) The given database scheme is 4×2

Employee(FName, Initial, Lname, *ENO*, DOB, Address, Sex, Salary, Supereno, Dno)

Department(Dname, *Dnumber*, mgreno, mgrstartdate)

Dept_locations (Dnumber, Dlocation)

Where the underlined column names are primary keys.

Write the queries in SQL with the above schema

(i) Retrieve the name and address of all employees who work for 'Production department'.

    (ii) Retrieve the employee's first and last name and the first and last name of his or her immediate supervisor.

    (iii) Find name of the department which has no employee.

    (iv) Find the maximum salaried employee of sales department located at "Kolkata".

(c) Write short notes on following topics (any *two*) :

    (i) 2PL

    (ii) Shadow paging

    (iii) Data model and its types

    (iv) Derived attribute

(d) (i) Define BCNF. Why is it called 3.5 NF ?

$1\frac{1}{2}+1\frac{1}{2}$

    (ii) What is multi-valued dependency ? Give example.

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(iii) Let R (A, B, C, D, E, P, G) be a relational schema in which the following functional dependencies are known to hold : $AB \rightarrow CD$, $DE \rightarrow P$, $C \rightarrow E$, $P \rightarrow C$ and $B \rightarrow G$. Convert the above schema in 3NF. 3

[Internal Assessment : 10 Marks]

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