ALCCS

Time: 3 Hours

JUNE 2015

Max. Marks: 100

ROLL NO.

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

Q.1 a. What do you mean by functional dependency? Discuss with suitable example.

- b. Define various properties of transaction.
- c. What is lock? What are the various types of locks used for concurrency control?
- d. What is time stamp? How a system generates time stamp?
- e. Explain the use of GROUP BY-clause and write an expression in SQL for the following query which is based on the relational schema mentioned in question number 2.

<u>Query:</u> For each department, retrieve the department number, the number of employees in the department, and their average salary.

f. Consider a relational scheme R = (A, B, C, D, E) and following set of multi valued dependencies:

M = (A - -> - -> BC, B - -> - -> CD, E - -> - -> AD)

Give a lossless join decomposition of scheme R into fourth normal form.

- g. What is weak entity set? Explain with suitable example. (7×4)
- Q.2 a. Consider the following relational database schema (3+3+3+3)

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EMPLOYEE													
FNAME	MINIT	LNAME	SSN	BDATE	ADDRE	SS	SEX	SALARY	SUPERSSN	DNO			
DEPARTMENT													
DNA		DNAM	1E <u>DN</u>	IUMBER	MGRSSN		MGRSTARTDATE						
PROJECT													
PNAM		PNAME	PNUMBER	PLO	CATION	DN	UM						
WORKS_ON													
ESSN PNO HOURS													
		ESSN D	SEX	BDAT	ER	ELATIONSHI	Р						

Write an expression in SQL for each of the following queries

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

(ii) For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.

(iii) Retrieve the name of each employee who works on all the projects controlled by department number 5.

(iv) Find the maximum salary, the minimum salary, and the average salary among all employees.

- b. Explain the function of ORDER BY and HAVING Clause with suitable example. (3+3)
- Q.3 a. Draw the E-R diagram for the university system which includes information about students, department, professors, courses, which student are enrolled in which course, which professor are teaching in which courses, student grades, which courses a department offers. Consider suitable assumption wherever required. (10)
 - b. Explain the term Generalization and Specialization with suitable example. (4)
 - c. Explain Multiple Granularity with suitable example. (4)
- Q.4 a. What are the purposes of normalization? Explain 3NF, 4NF and BCNF with suitable example. (2+2+3+3)

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	b.	Define Serializability, Conflict Serializability and view Serializability schedule w suitable example. (2+3+	rith 3)
Q.5	a.	What are the various types of Distributed Database Systems? Explain fragmentation distributed database systems. (4+	ion 4)
	b.	What is relational algebra? Explain its various operations. (2+	4)
	c.	Define check point and its impact on data base recovery.	(4)
Q.6	a.	Describe Two Phase Locking protocol with suitable example.	8)
	b.	Describe Deadlock with suitable example and also explain about recovery from the deadlock. (2+	the 3)
	c.	Consider the universal relation; R = (A,B,C,D,E,F,G,H,I,J) And the set of functional dependencies F as given below $F\{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$ (i) Determine the key for R (ii) Decompose R into second normal form (3+	7: 2)
Q.7		Write the short notes on the following:	
		 (i) Query Optimization (ii) Time Stamp Based Concurrency Control (iii) Relational Model (6+6+ 	6)