JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- Oct 2017

B.Tech/M.Tech IIIrd Semester

COURSE CODE: 10B11CI312   MAX. MARKS: 25

COURSE NAME: Database systems

COURSE CREDITS: 4   MAX. TIME: One Hour Thirty Minutes

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1 Write the following queries in SQL, Assume that we have an employee-project schema with the following relations: (Keys are in all capitals.)   [1x5=5]
   - Employee(name, SSN, bdate, address, sex, salary, superssn, dno); name is the employee's name; bdate is birth date; superssn is supervisor's social security #; dno is dept #
   - Department(dname, DNUMBER, mgrssn, mgrstartdate); mgrssn is manager ssn
   - Dept_locations(DNUMBER, DLOCATION); dlocation is department location
   - Project(Pname, PNUMBER, plocation, dnum)
   - Works_on(ESSN, PNO, hours); ESSN is employee ssn, pno is project number
   - Dependent(ESSN, DEPENDENT_NAME, sex, bdate, relationship)

1) Retrieve the name of all employees who have no dependents.

2) For each project on which more than two employees work, retrieve the project number, the project name and the number of employees who work on that project.

3) For each dept having more than 5 employees, retrieve the department number, and the number of employees making more than $40,000.

4) Find the names of employees who work on *all* the projects controlled by department number 5.

5) Retrieve the birthdate and address of the employee whose name is "John B. Smith".

Q2) Consider the following collection of relations and dependencies. For each relation, ▮▮▮▮ (a) determine the candidate keys, and (b) if a relation is not in BCNF then decompose it into a collection of BCNF relations.   [5]

1) R1 (A, C, B, D, E) with functional dependencies A → B, C→ D

2) R6 (A, B, C, D, E) with functional dependencies A→ E, BC→ A, DE→ B.

Q3 a) Consider a schema R (A, B, C, D) and functional dependencies A → B and C → D. Then decompose R into R1 (A, B) and R2(C, D). Is the decomposition dependency preserving? Is it lossless-join decomposition? Illustrate   [2.5]

b) What do you mean by a weak entity? A weak entity set can always be made into a strong entity set by adding to its attributes the primary key attributes of its identifying entity set. Outline what sort of redundancy will result if we do so.   [2.5]

Q4 a) Given relation R = (A, B, C, D, E) with functional dependencies A -> BC; CD -> E; B -> D; E -> A   [2.5]

1) What are the candidate keys of R   2) What is the canonical cover for the above set of functional dependencies?

b) Explain the types of nested queries. Also can you un-nest the following query?

Select A.A From A Where A.B = 42 and A.C in (Select B.A From B Where B.D = 'Darth' and A.E = B.B)   [2.5]

                                                                                                                                                                        [2.5]

Q5 a) What is normalization? What is the need of normalization? Differentiate between first normal form and second normal form.   [2.5]

b) Suppose a disk drive has the following characteristics: [2.5]

5 surfaces, 512 tracks per surface, 128 sectors per track 1024 bytes per sector, Track-to-track seek time of 12 milliseconds, Rotational speed of 1500 RPM

1) What is the capacity of the drive?

2) What is the access time?