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3rd Semester Regular / Back Examination 2015-16
DATABASE MANAGEMENT SYSTEM
BRANCH: MECHANICAL
Time: 3 Hours
Max Marks: 70
Q.CODE: T713
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   Answer the following questions: **(2 x 10)**
- **a)** What do you mean by Data Independence?
- **b)** Explain the role of DBA (Database Administrator).
- **c)** Differentiate between Schema and Instance.
- **d)** Define the Integrity Constraints.
- **e)** Draw symbols for following in E-R diagram:
  Weak Entity Set, Derived Attribute.
- **f)** What are the characteristics of a Relation?
- **g)** Explain DDL, DML, and DCL.
- **h)** Define functional dependency.
- **i)** List the ACID properties. Explain the usefulness of each.
- **j)** What is a checkpoint and when does it occur?

Q2 **a)** Explain the 3-level schema architecture of Database System.   **(5)**
    b) Construct an ER diagram for the database of a hospital with a set of patients   **(5)**
and a set of medical doctors. Patients may be indoor as well as outdoor
patients. Each patient is associated with a log of various tests and examination
conducted.

Q3 **a)** Consider the employee database-   **(5)**
Employee(e_name, street, city)
Works(e_name, company_name, salary)
Company(company_name, city)
Manages(e_name, m_name)
Write SQL statement for the following queries-
1) Write name of all employees who work in 'FBI'.
2) Find names and cities of residence of all employees who work for 'FBI'.
3) Find the company that has smallest payroll.
4) Give 10% raise in salary all employees.
5) Delete all types of 'works' relation for employees of 'FBI'.
    b) Explain with suitable example the JOIN operation in relational algebra. Also   **(5)**
explain its type.

Q4 Consider a relation R(A, B, C, D, E) and F set of functional dependencies: **(10)**
F { A→BC,
   CD→E,
    B→D,
    E→A}
  i) Find candidate key of relation R.
  ii) Compute closure of B or B+.
  iii) Compute canonical cover of F i.e. Fc.

Q5 **a)** What is the need of normalization? Explain 1NF, 2NF and 3NF with suitable example. **(5)**

b) Normalize (decompose) following relation into lower to higher normal form. (From 1NF to 2 NF). **(5)**

PLANT	MANAGER	MACHINE	SUPPLIER_NAME	SUPPLIER_CITY
Plant-A	Ravi	Lath	Jay Industry	Sambalpur
		Boiler	AB Appliance	Bhubaneswar
Plant-B	Meena	Cutter	Raj Machinery	Cuttack
		Boiler	Daksh Industry	Rourkela
		CNC	Jay Industry	Sambalpur

Q6 **a)** Draw a state diagram and discuss the typical states that a transaction goes through during execution. **(5)**

b) Discuss the concept of Conflict Serializability. **(5)**

Q7 **a)** What is the concept of concurrency in the database? What are the basic problems in concurrent scheduling? **(5)**

b) What do you mean by log-based recovery? Differentiate between deferred update and immediate update techniques of recovery. **(5)**

Q8 Write short notes on any two: **(5 x 2)**
a) Security & Integrity of Data
b) Two Phase Locking Technique
c) Lossless Decomposition
d) Transaction failures