Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2130703 Date:21/12/2015

Subject Name: Database Management System

Time: 2:30pm to 5:00pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Short Questions **14**

1 Define DBMS and list out purpose of DBMS.

2 Explain generalization and specialization in ER diagram with suitable example.

3 Draw symbols for following in E-R diagram: Weak Entity set, Derived attribute

4 List out the Mapping Cardinalities in ER diagram

5 Define Transaction

6 Who is a DBA?

7 _____ can be used to retrieve data from multiple tables.
A. Embedded SQL. B. Dynamic SQL. C. Joins. D. Views.

8 SQL belongs to the category of _____.
A. 2GL. B. 3GL. C. 4GL. D. 5GL.

9 _____ is data about data.
A. Data type. B. Data item. C. Meta data. D. Information.

10 To modify the students table and to add a primary key on the student_id Column, Which statement must be used to accomplishes this task? Note: The table is currently empty.
A. Alter table students add primary key student_id;
B. Alter table students add constraint primary key (student_id);
C. Alter table students add constraint stud_id_pk primary key student_id;
D. Alter table students add constraint stud_id_pk primary key (student_id);

11 Which clause should be used to exclude group results?
A. WHERE. B. HAVING. C. RESTRICT. D. GROUP BY.

12 New fields can be added to the created table by using _____ command.
A. ALTER. B. SELECT. C. CREATE. D. UPDATE.

13 For which action the TO_DATE function can be used?
A. To convert any date literal to a date.
B. To convert any numeric literal to a date.
C. To convert any character literal to a date.
D. To convert any date to a character literal.

14 The _____ knows the details of the data storage.
A. decision support system analyst. B. database administrator.
C. database manager. D. transaction manager.

Q.2 **(a)** Explain the dirty read problem **03**

(b) During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur. **04**

(c) Solve the queries for the following database using Relational Algebra **07**

branch (branch-name, branch-city, assets)
customer (customer-name, customer-street, customer-only)
account (account-number, branch-name, balance)
loan (loan-number, branch-name, amount)
depositor (customer-name, account-number)
borrower (customer-name, loan-number)

1)Find all loans of over $1200
2)Find the loan number for each loan of an amount greater than $1200
3)Find the names of all customers who have a loan, an account, or both, from the bank
4)Find the names of all customers who have a loan and an account at bank.
5)Find the names of all customers who have a loan at the Perryridge branch.
6)Find the names of all customers who have a loan at the Perryridge branch but do not have an account at any branch of the bank.
7)Find the names of all customers who have a loan & an account at the Perryridge branch.

OR

(c) Draw an ER diagram for describing the activities of a departmental store **07**

Q.3 **(a)** Signify the concept of Aggregation in ER Diagram with example. **03**

(b) Explain following terms with suitable example. **04**
(1) Primary Key (2) Candidate Key (3) Foreign Key (4) Check Constraint

(c) We have following relations: **07**

EMP(empno, ename, jobtitle, managerno, hiredate, sal, comm, deptno)
DEPT(deptno, dname, loc)
Answer the following queries in SQL.
i) Find the Employees working in the department 10, 20, 30 only.
ii) Find Employees whose names start with letter A or letter a.
iii) Find Employees along with their department name.
iv)Insert data in EMP table.
v) Find the Employees who are working in Smith's department
vi) Update Department name of Department No=10
vii)Display employees who are getting maximum salary in each department

OR

Q.3 **(a)** Given relation R with attributes A,B, C,D,E,F and set of FDs as **A-> BC, E-> CF, B->E and CD-> EF**. Find out closure $\{A,B\}^+$ of the set of attributes. **03**

(b) A college keeps details about a student and the various modules the student studied. These details comprise regno - registration number , n - student name , a - student address ,tno - tutor number , tna - tutor name ,dc - diploma code , dn - diploma name , mc - module code , mn - module name , res - module exam result where details(<u>regno</u>,n,a,tno,tna,dc,dn,(mc,mn,res)) **04**

dc -> dn tno -> tna mc,mn -> res n -> a mc -> mn

Reduce the relation DETAILS to third normal form.

	(c)	Draw an ER diagram for a car insurance company that has a set of customers each of whom owns one or more cars. Each car has associated with it 0 to any number of recorded accidents.	**07**
Q.4	**(a)**	Given R= (A, B, C, G, H, I). The following set F of functional dependencies holds **A --⩾ B A --⩾ C CG --⩾ H CG --⩾ I B --⩾ H** Compute AG^+ . Is AG a candidate key?	**03**
	(b)	How is DBMS better than File Management System?	**04**
	(c)	Explain two phase locking protocol in detail.	**07**
		OR	
Q.4	**(a)**	Compute the closure of R (A, B, C, D, E) with the following set of functional dependencies **A --> BC CD --> E B --> D E --> A** List the candidate keys of R.	**03**
	(b)	Explain ACID properties of transactions	**04**
	(c)	Explain Lock-Based Protocols	**07**
Q.5	**(a)**	Explain deadlock with example.	**03**
	(b)	Prove the statement "Every relation which is in BCNF is in 3NF but the converse is not true"	**04**
	(c)	Enlist and explain the basic steps in Query Processing	**07**
		OR	
Q.5	**(a)**	Assuming worst case memory availability and the following given statistics for the relations customer and depositor **Number of records of** *customer*: 10,000 *depositor*: 5000 **Number of blocks of** *customer*: 400 *depositor*: 100 Estimate the cost i) with *depositor* as outer relation ii) with *customer* as the outer relation	**04**
	(b)	Write a PL/SQL cursor to display the names and branch of all students from the STUDENT relation.	**04**
	(c)	What is cryptography? Explain the difference between symmetric & asymmetric key cryptography.	**06**

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