Hall Ticket Number:

Code No. : 31121

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (CSE) III Year I-Semester Main & Backlog Examinations, December-2017

Database Management Systems

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Differentiate Physical and Logical data Independence
2. Define aggregation. Give an example
3. Write a Relational algebra query to find all customers of the bank who have an account but not a loan

   Customer(Customer_name, Customer_city)

   Borrower(Customer_name, Loan_number)

   Depositor(Customer_name, account_number)
4. Write an SQL query to find the average account balance of those branches where the average account balance is greater than $1200.

   Branch(Branch_name, branch_city,assets)

   Account(Account_number, Branch_name, balance)
5. Differentiate Embedded SQL and Dynamic SQL.
6. Compute the Closure of the following set of functional dependencies for relation schema R= (A,B,C,D,E)

   A →BC

   CD →E

   B→D

   E →A

   And List the candidate keys for R.
7. How dynamic hashing is useful in databases than a static hashing?
8. Draw the Transaction state diagram.
9. What is locking? How to implement lock table?
10. What is Stable Storage?

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Draw and Explain the 3-Schema architecture.

    b) Construct an E-R diagram for a university registrar's office where the university registrar's office maintains data about the following entities:

       i) Course: including number, title, credits, syllabus and prerequisites

       ii) Course offerings: including course number, year, semester, section number, instructors, timings, and classrooms

       iii) Students: including student-id, name, and program

       iv) Instructors: including id, name, department, and title.

    Document all assumptions about mapping constraints.

Contd...2

12. a) Explain the extended relational-algebra operations.

    b) Consider the relational schema

    Student(student_id, student_name)

    Registered(student_id, course_id)

    i) Write an SQL query to list the student-id and name of each student along with the total number of courses that the student is registered for.

    ii) Students who are not registered for any course must also be listed, with the number of registered courses shown as 0.

13. a) Compare 3NF and BCNF with an example.

    b) Write a Trigger program that no duplicate values should be inserted in to deptno in department relation.

14. a) How to implement Atomicity and Durability in Transactions.

    b) Construct a B+ tree for the following set of key values (2,3,5,7,11,17,19,23,29,31)

    Where the number of pointers are 4 and also perform the following operations on tree

    i) Insert 10

    ii) Insert 12

    iii) Delete 23

    iv) Delete 19

15. a) Illustrate the procedure involved in log-based recovery.

    b) Show the deadlock prevention for the following schedule

    Where Transaction T_1,T_2,T_3 have timestamps 5,10,15 respectively

    i) If Transaction T_1 requests a data item held by T_2

    ii) If Transaction T_3 requests a data item held by T_2

16. a) Describe the responsibilities of a database administrator.

    b) Explain the constraints on Generalization and Specialization.

17. Answer any ***two*** of the following:

    a) Write about lossless decomposition.

    b) What are Bitmap Indices.

    c) What is cascade less schedule? Why cascade less schedule is desirable?