Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **MCA**
MCA304

3rd Semester Regular/Back Examination 2017-18
DATABASE MANAGEMENT SYSTEMS
BRANCH: MCA
Time: 3 Hours
Max Marks: 100
Q.CODE: B1040

Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions by choosing the appropriate answer from the given choices.** **(2x10)**

a) _____is the default super key of R(A,B,C,D)
(i) A (ii) NULL (iii) Can't be determined (iv) ABCD

b) Degree of $\sigma_{<condition>}$ (R) is _____ Degree of R
(i) Less than (ii) Greater than (iii) Equal To (iv) None of these.

c) _____ constraint can't be declare at table level in SQL.
(i) Primary Key (ii) Not Null (iii) Foreign Key (iv) Unique Key

d) Which of the following may be regarded as metadata?
(i) E-R diagram (ii) Table (iii) View (iv) Data dictionary

e) _____ statement in SQL allows to change the definition of a table
(i) UPDATE (ii) CREATE (iii) ALTER (iv) SELECT

f) DDL is used to specify_____ schema.
(i) Internal (ii) conceptual (iii) Both (i) & (ii) (iv) None

g) In ER diagram generalization is represented by _____symbol.
(i) Ellipse (ii) Diamond (iii) Square (iv)Triangle

h) _____property will check whether all the operation of a transaction is completed or none.
(i) Consistency (ii) Isolation (iii) Atomicity (iv) Durability

i) In _____ normal form, a composite attribute is converted to individual attributes.
(i) Second (ii) Third (iii) Fourth (iv) First

j) For a Schedule having *n* transactions ,_____ no. of serial schedule is possible
(i) 2^n (ii) n-1 (iii) n! (iv) n^2

Q2 **Answer the following questions :** **(2x10)**

a) Define Primary Key. Differentiate it with Unique Key.

b) Define functional dependency. State Armstrong's inference rules.

c) Create a table REGISTRATION in SQL with the following details,
REGISTRATION(*Fid :Number, Cid : String, Semester :String*).
Make *Fid* and *Cid* as composite primary key.

d) Given a relation EMP(*Eid, Ename, Salary, dno)* where dno represents the department number to which an employee belongs. Write a SQL statement to find out the employees who are getting more than the average salary of department 5.

e) Given a relation R(A,B,C,D,E) with a set of FDs F={A→E, BC→A, DE→B}.
Find the candidate key(s).

f) Given two sets of FDs F= {A→BC, D→AE} and G = {A→B, AB→C, D→AC, D→E}.
Check, Whether F covers G.

g) What is strict schedule? Give an example.

h) Given a schedule S: r1(x); w1(x); r2(x); w2(x); c2; r1(y); a1;
Is it recoverable? If not, make it a recoverable one.

i) Why System log is used for? Write different entries of a System log.

j) What do you mean by a view? Give an example.

Q3 **a)** Consider a bank database with the following information : **(7)**
A bank has many branches and a large number of customers. A customer can open different kinds of accounts with the bank. The bank keeps track of a customer by his A/C No., name, address and phone number. There are different types of loans, each identified by a loan number. A customer can take out more than one type of loan, and all branches can give loans. Loans have a duration and interest rate. The account holder can enquire about the balance in his account.
Draw an ER diagram for the bank .Make suitable assumptions and use them in your ER diagram.

b) Describe three schema architecture? Why do you need this architecture? Write different schema definition languages which support this architecture . **(8)**

Q4 **a)** What is referential integrity? Give one example. What options does SQL give application programmers for dealing with violations of referential integrity? **(7)**

b) Consider the following relations describing Student details, Course Details and the list of courses for which a student is registered. STUDENT(*RollNo, Name*, *Branch*),COURSE(*Code,Title*) and REGISTRATION(*RollNo, Code*). **(8)**
Answer the following questions in Relational Algebra
Find the title of the course to which no student is registered.
List the course codes and titles in which at least one student is registered.
Find the Roll number of the students who are registered for both 'Database Management' and 'Algorithms'.
Find the list of courses in which all students are registered.

Q5 **a)** Given a set of FDs F={A→BC, B→C, A→B, AB→C, AC→D}.Find the minimal cover of F. **(7)**

b) Consider a relation R(A, B, C, D) and a set of FDs F={ AB→C, B→D, C→A }. Decompose R into BCNF relations. Is your decomposition dependency preserving? IF not, design a dependency preserving decomposition of R. **(8)**

Q6 **a)** What do you mean by concurrent transactions? Discuss Lost Update problem and Dirty Read problem. **(7)**

b) Define serial schedule and serializable schedule. Given below two schedules S1 and S2 involving three transactions T1, T2 and T3. Check whether each schedule is serializable? If a schedule is serializable, write the equivalent serial schedule. **(8)**
S1: r1(x);r2(z);r1(z);r3(x);r3(y);w1(x);w3(y);r2(y);w2(z);w2(y);
S2: r1(x);r2(z);r3(x);r1(z);r2(y);r3(y);w1(x);w2(z);w3(y);w2(y)

Q7 **a)** Discuss 2-phase locking protocol with an example and prove that it guarantees serializability. **(7)**

b) Given a table EMP with columns Eid, Ename, Salary, and Sex, where sex represents either male or female employees. Write a PL/SQL block to declare a cursor to display the list of Male and Female employees. **(8)**

Q8 **Write short notes on (ANY THREE)** **(5x3)**

a) Database security
b) Transaction states and properties
c) Deadlock prevention protocol for transactions
d) Anomalies