A7-R3: DATABASE MANAGEMENT SYSTEMS

NOTE:

1. There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.

2. **PART ONE** is to be answered in the **TEAR-OFF ANSWER SHEET** only, attached to the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book.

3. Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the answer sheet for **PART ONE** is returned. However, candidates, who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the answer sheet for **PART ONE**.

TOTAL TIME: 3 HOURS **TOTAL MARKS: 100**

(PART ONE – 40; PART TWO – 60)

PART ONE
(Answer all the questions)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

1.1 Which one is an incorrect statement about a view?
A) A view is derived from other tables.
B) It can be updated like a table.
C) DROP VIEW is used to dispose it.
D) All are correct statements.

1.2 To represent many to many relationship between two entity types A and B in a relational model
A) put identifying attribute(s) of A in the relation representing B.
B) put identifying attribute(s) of B in the relation representing A.
C) create a new relation to represent the relationship.
D) It can not be represented.

1.3 Which one is lowest level data model?
A) physical data model
B) logical data model
C) external data model
D) none of the above

1.4 Which one is not a version of JOIN?
A) Equi join
B) outer join
C) natural join
D) all are versions of JOIN.

1.5 Read the following statements.
Relational calculus is
i) equivalent to relational algebra in its capabilities.
ii) it is stronger than relational algebra.
iii) it is weaker than relational algebra.
iv) it is based on predicate calculus of formal logic.
Now answer which one is a correct option?

A) i) and iv) are true
B) ii) and iv) are true
C) only iii) is true
D) iii) and iv) are true

1.6 A deletion anomaly means
A) A constraint that does not allow to delete some rows from a table.
B) Unauthorized user is not allowed to delete data from the database.
C) Unintentional loss of data due to deletion of other data.
D) None of the above

1.7 Which of these is not TRUE in case of responsibilities of Data Base Administrator (DBA).
A) Acquiring hardware and software resources.
B) Authorizing access to database.
C) Data entry in to the database.
D) All the above statements are true.

1.8 An alias is
A) An alternate name given to a relation.
B) An alternate name given to an inner query
C) An alternate name given to a user.
D) None of the above

1.9 Statement that uses a condition to control iterative execution of a statement block
A) IF statement
B) WHILE statement
C) BREAK statement
D) None of the above

1.10 If a relation A has m attributes and relation B has n attributes and A divide by B is possible then A divide by B has
A) m*n attributes
B) m-n attributes
C) n-m attributes
D) m / n attributes

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "tear-off" sheet attached to the question paper, following instructions therein. (1 x 10)

2.1 Fourth normal form deals with join dependencies.
2.2 Shared lock allows more than one transactions to update an item concurrently.
2.3 Null values are allowed in a primary key.
2.4 Relational algebra is a procedural language.
2.5 Dead-lock does not occur in time stamping scheme.
2.6 A foreign key can not refer to its own relation.
2.7 A UNION B can be defined for any two relations A and B.
2.8 A view is a table whose rows are computed as needed.
2.9 If GROUP BY is omitted in a SELECT command; entire table is taken as a group.
2.10 All relations are in 1 NF.

3. Match words and phrases in column X with the closest related meaning/ word(s)/phrase(s) in column Y. Enter your selection in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

X		Y	
3.1	Query	**A.**	Media failure
3.2	Trigger	**B.**	Shared lock
3.3	Aggregation	**C.**	Discretionary access control
3.4	Prime attributes	**D.**	A desired property of a schedule
3.5	Disk crash	**E.**	Member of a primary key
3.6	Not (∃x) (not p(x))	**F.**	Exclusive lock
3.7	Read lock	**G.**	Relationship between an object and its parts.
3.8	Durability	**H.**	Members of primary key.
3.9	GRANT	**I.**	A desired property of a transaction
3.10	Foreign key	**J.**	Entity integrity
		K.	Members of any key
		L.	Question about data
		M.	(∀x) (p(x))
		N.	Referential integrity
		O	(∃ x) (p(x))
		P	A procedure automatically invoked in response to a specified event

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Enter your choice in the "tear-off" answer sheet attached to the question paper, following instructions therein. (1 x 10)

A.	Universal	**B.**	Backup	**C.**	Conceptual
D.	Track	**E.**	Existantial	**F.**	User data
G.	Aggregate	**H.**	Metadata	**I.**	Committing
J.	Aborting	**K.**	Unique	**L.**	Log
M.	Logical	**N.**	Cartesian product	**O.**	Owner
P.	Deferred	**Q.**	Distinct	**R**	Block
S.	Join	**T.**	Record		

4.1 ER modeling is used in _____ design step.

4.2 COUNT is a(n) _____ function.

4.3 If _____ is contained in the SELECT clause, duplicates are removed.

4.4 When dead lock is detected, it is resolved by _____ one of the participating transactions in the dead lock.

4.5 Data dictionary stores _____.

4.6 Divide by operation of relation algebra is equivalent to _____ quantifier.

4.7 _____ is result of joining each row of a relation with every row of other relation.

4.8 _____ is a record of all transactions and corresponding changes.

4.9 A(n) _____ is a unit of data in which data is written and read from a disk.

4.10 In _____ update scheme, updates are not written to database immediately.

PART TWO

(Attempt any **FOUR** questions)

5. Tourism department operates boating facility at one of its picnic spot. There are a number of boats with different capacities. These boats are owned by a number of boatmen. A boatman may own a number of boats but a boat is owned by only one boatman. Each boat has an identifying number.

Tourist parties book boats according to their party size. Thus a party may book more than one boats or several parties may book same boat. Parties are charged on number of persons, hours booked and boat type. A record of all rides is kept to charge boatmen a certain percentage of their income.

a) Identify entities, attributes and relationships giving functionalities and draw E-R diagram for the system.

b) Convert this to relational tables explaining logic involved.

c) Show some important reports, which your proposed system can generate.
State your assumptions (if any).

(5+5+5)

6.

a) Explain the Codd rules regarding null values and database description.

b) List all relational algebra operations and explain one of them.

c) What is a well formed formula? How is it formed? What are its uses?

(6+4+5)

7.

a) Explain the three levels ANSI/SPARC database architecture with its significance.

b) Explain major steps in database development life cycle.

c) Explain with examples, how primary key and foreign key concepts is useful in relational data model?

(6+6+3)

8.

a) The table emp contains following data: emp_num, countries visited and names of dependents. What is the key to this relation? Which normal form does it belong to? Is this relation desirable? Give reason. Split it if necessary.

b) Discuss major problems associated with concurrent processing with examples. What is the role of locks in avoiding these problems? Name one of the protocol used with locks.

c) Discuss REDO and UNDO operations and their use in recovery methods.

(5+5+5)

9. Consider the following tables which give details of customers, trucks and packets booked by customers, which are carried by trucks and write SQL commands to do the following:

Tables:

CUSTOMER(c_no, c_name, c_address)
TRUCK(t_no, driver_name)
PACKET(p_no, c_no, t_no, date_of_booking, weight, destination)

Queries:

i) Destinations which have received more than 10 packets.

ii) Name of Customers who have sent at least one packet of weight more than one kg to 'BOMBAY'.

iii) Name of all Customers whose packets were delivered a driver whose name is 'RAJA'.

iv) Three top customers (names) in terms of total packet weight sent by them. (list is to be in descending order of total weight.)

v) Name of all Customers whose individual shipments are less than one kg.

(3x5)