

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), April-May 2016
B. Tech in Computer Science Engineering, Semester IV

Roll No.....

CSE401: DATABASE MANAGEMENT SYSTEMS

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

10

- i. The result of a SQL SELECT statement is a _____.
a) File; b) Record; c) Table; d) Tiny database;
- ii. Which is the subset of SQL commands used to manipulate Oracle Database Structures, including tables?
a) Data Definition Language; b) Data Manipulation Language; c) Data Described Language; d) Data Retrieval Language;
- iii. Which of the following refers to an entity in which the identifier of one entity includes the identifier of another entity?
a) ID dependent entity; b) Strong entity; c) Weak entity; d) ID independent entity;
- iv. Which of the following indicates the maximum number of entities that can be involved in a relationship?
a) Maximum cardinality; b) Minimum cardinality; c) Maximum entity count; d) Minimum entity count;
- v. A weak entity set in an E-R diagram is an entity set that :
a) has a primary key; b) must be part of a one to many relationship set; c) is not existence dependent on a dominant entity; d) must not participate as owner in an identifying relationship with another entity set;
- vi. property will check whether all the operation of a transaction completed or none.
a) Atomicity; b) Consistency; c) Isolation; d) Durability;
- vii. Commit and rollback are related to
a) data integrity; b) data consistency; c) data sharing; d) data security;
- viii. A table is in BCNF if it is in 3NF and if every determinant is a key.
a) dependent; b) normal; c) candidate; d) Both B & C;



- ix Disk drives use _____ to detect failures.
a) Handlers; b) Crash Reports; c) Bad Sectors; d) Checksum;
- x When a transaction enters the system and starts execution, it writes _____ and is always kept on a stable storage media.
a) Log; b) Report; c) Data; d) Checkpoint;

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

- What is the difference between primary index and a secondary index?
- What undesirable dependencies are avoided when a relation is in 3NF? Given an example.
- What is the effect of cascade update?
- Differentiate between unique key and primary key giving an example.

Q.3A Consider the entity sets and attributes shown in the table below. Place a checkmark in one column in each row to indicate the relationship between the far left and right columns.

05

- The left side has a relationship with the right side.
- The right side is an attribute of the left side.
- The left side is a specialization of the right side.
- The left side is a generalization of the right side.

Entity Set	(a) Has a Relationship with	(b) Has an Attribute that is	(c) Is a Specialization of	(d) Is a Generalization of	Entity Set or Attribute
1. MOTHER					PERSON
2. DAUGHTER					MOTHER
3. STUDENT					PERSON
4. STUDENT					Student_id
5. SCHOOL					STUDENT
6. SCHOOL					CLASS_ROOM
7. ANIMAL					HORSE
8. HORSE					Breed
9. HORSE					Age
10. EMPLOYEE					SSN

Q.3B Consider the following decompositions for the relation schema R $(A, B, C, D, E, F, G, H, I, J)$. 05

Determine whether each decomposition has (1) the dependency preservation property, and (2) the lossless join property, with respect to F .

$$D1 = \{R1, R2, R3, R4, R5\};$$

$$R1 = \{A, B, C\}, R2 = \{A, D, E\}, R3 = \{B, F\}, R4 = \{F, G, H\}, R5 = \{D, I, J\}$$

Q.4A Suppose we are using hashing on a file that contains records with the following search key-values:
2,3,5,7,11,17,19,23,29,31

05

Show the hash structure for this file if the hash function is $h(x) = x \bmod 8$ and buckets can hold three records.

Q.4B What are the causes of bucket overflow in hash file organization? What can be done to reduce the occurrence of bucket overflows? 05

Q.5A A database receives maximum queries pertaining to range (less than, greater than, between) on a certain column particular table. 05

What would you prefer in such case between Indexing and Hashing and why? Explain giving an example.

Q.5B Discuss insertion, deletion, and modification anomalies. Why are they considered bad? Illustrate with examples. 05

Q.6A Consider the relation R, which has attributes that hold schedules of courses and sections at a university; $R = \{\text{Course_no, Sec_no, Offering_dept, Credit_hours, Course_level, Instructor_ssn, Semester, Year, Days_hours, Room_no, No_of_students}\}$. 05

Suppose that the following functional dependencies hold on R:

$\{\text{Course_no}\} \rightarrow \{\text{Offering_dept, Credit_hours, Course_level}\}$

$\{\text{Course_no, Sec_no, Semester, Year}\} \rightarrow \{\text{Days_hours, Room_no, No_of_students, Instructor_ssn}\}$

$\{\text{Room_no, Days_hours, Semester, Year}\} \rightarrow \{\text{Instructor_ssn, Course_no, Sec_no}\}$

Try to determine which sets of attributes form keys of R. How would you normalize this relation?

Q.6B Consider the following relations for an order-processing application database at ABC, Inc. 05

ORDER (O#, Odate, Cust#, Total_amount)

ORDER_ITEM (O#, I#, Qty_ordered, Total_price, Discount%)

Assume that each item has a different discount. The Total_price refers to one item, Odate is the date on which the order was placed, and the Total_amount is the amount of the order. If we apply a natural join on the relations ORDER_ITEM and ORDER in this database, what does the resulting relation schema look like? What will be its key? Show the FDs in this resulting relation. Is it in 2NF? Is it in 3NF? Why or why not? (State assumptions, if you make any.)

OR

Q.6B Consider the following relation for published books:

BOOK (Book_title, Author_name, Book_type, List_price, Author_affil, Publisher)

Author_affil refers to the affiliation of author. Suppose the following dependencies exist:

$\text{Book_title} \rightarrow \text{Publisher, Book_type}$

$\text{Book_type} \rightarrow \text{List_price}$

$\text{Author_name} \rightarrow \text{Author_affil}$



What normal form is the relation in? Explain your answer.

Q.7A List and Explain State diagram of Transactions. 05

Q.7B Showcase whether following transactions are serializable or not? 05

T_1	T_2
$read(A)$ $A := A - 50$ $write(A)$ $read(B)$ $B := B + 50$ $write(B)$	$read(A)$ $temp := A * 0.1$ $A := A - temp$ $write(A)$ $read(B)$ $B := B + temp$ $write(B)$

OR

Q.7B Find below lock compatibility matrix. Check its correctness and correct it if it is not correct. 05

	IS	X	SIX	S	IX
IS	N	Y	N	Y	N
X	Y	Y	Y	Y	Y
SIX	Y	N	Y	Y	Y
S	Y	Y	Y	Y	N
IX	N	Y	N	Y	Y

Q.8A Construct an ER diagram of a bookstore. Assume necessary attributes and constraints. Use Generalization - specialization. The bookstore has various warehouses, each with a unique code, address and phone number. Each warehouse stocks books. Details of books such as book_no, year of publishing, title, price. Details of publisher like id, name, address, phone etc. Details of authors like name, address, phone, author_id etc are maintained. A customer can place his order for books and depending on availability will be delivered the books. Show data type of all attributes. 10

Q.9A Students (student_id, student_name, address, adharcardno) 20
 Enrolment (student_id, subject_id, mark)
 Subject (subject_id, subject_name, department)

Write Create table statement and Apply the following constraints.

- Marks can only be between 0-100.
- Department can only be 'Mathematics' or "Computer Science".
- Subject_id starts with CSE, ex. CSE302, CSE505 etc.
- Primary key and Foreign keys should be mentioned.
- Adharcard number should be unique.

Write down the following Queries. (ANY FIVE)

1. Find the names of students studying DBMS Subject.
2. Find student id's of students enrolled in CSE302 but not in CSE304.
3. Find student id's of those students who scored better than any of the marks obtained by student with id 303.
4. Find student id's of those students who got a scored better than any of the marks obtained by student with id 303 in Mathematics department subjects.
5. Find subject id's of those subjects in which student 303 is enrolled in which he scored better than his marks in all the subjects in Mathematics department.
6. Find subject id's of those subjects in which student 303 has the highest marks in that subject.
7. Find those subjects in which Kina scored better than Rita.
8. Find those subjects in which Krishna Shah scored better than all marks obtained by student Rita Patel.

