



# **WEST BENGAL UNIVERSITY OF TECHNOLOGY**

IT-601

# **DATABASE MANAGEMENT SYSTEM**

**Time Allotted: 3 Hours**

**Full Marks: 70**

*The questions are of equal value.*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

## **GROUP A**

### **(Multiple Choice Type Questions)**

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- (v) What type of locks forbids any other user to access the data in any way?  
(A) Shared      (B) Exclusive    (C) Limited    (D) Concurrent
- (vi) Which of the following makes the transaction permanent in the database?  
(A) View      (B) Commit      (C) Rollback      (D) Flashback
- (vii) The primary key is selected from the  
(A) composite keys      (B) determinants  
(C) candidate keys      (D) foreign keys
- (viii) Lock point in a two phase locking protocol denotes  
(A) start of growing phase      (B) end of growing phase  
(C) start of shrinking phase      (D) anywhere in the phase
- (ix) The distinguishable parts of a record are called  
(A) files      (B) data      (C) fields      (D) database
- (x) Given a relation R, attribute A is \_\_\_\_\_ on B if each value of A in R is associated with precisely one value of B.  
(A) Multivalued dependency      (B) Data independence  
(C) Functional dependency      (D) Transitive dependency
- (xi) Precedance graph helps to find a  
(A) serializable schedule      (B) recoverable schedule  
(C) deadlock free schedule      (D) cascadeless schedule
- (xii) Spurious tuples are generated in  
(A) Equi join      (B) Self join  
(C) Cartesian join      (D) None of these

**GROUP B**  
**(Short Answer Type Questions)**

Answer any *three* questions.

$3 \times 5 = 15$

2. (a) What is the difference between a database and a table?  
(b) Why are entity integrity and referential integrity important in a database?

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3. (a) What is the disadvantage of Cartesian product and how to recover from it?  
 (b) Explain full outer join, left outer join, right outer join with examples.
4. Define BCNF. How does it differ from 3NF? Why is it considered stronger from 3NF?
5. Explain growing and shrinking phase of a two phase locking protocol.
6. Write SQL Statements on the following tables:  
 salespeople (snum, sname, city, comm)  
 customer (cnum, cname, city, rating, snum)  
 orders (onum, amt, odate, cnum, snum).  
 (a) Show the commission of all the salesperson who receive at least one order of amount greater than Rs. 5000.  
 (b) Find all customers located in cities where salesperson "AMIT" has customers.

**GROUP C**  
**(Long Answer Type Questions)**

Answer any *three* questions.

$3 \times 15 = 45$

7. (a) Construct an ER diagram for the following problem:  
 A store has different counters managed by different employees. A counter has different items, but no two counters have common items. Customers buy from different counters but bills are prepared at bill counter only. Once in a month performance of persons managing counters is evaluated in terms of sales. Items are also reviewed and slow moving items are identified.  
 (b) What is weak entity set? Explain with suitable example.  
 (c) Define a foreign key. Why is it required? How does it play a role in the Join operation?

8+3+4

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8. (a) Discuss “updation anomalies” with an example. Suggest a remedy to it. 3+6+3+3  
 (b) A table Supply (sno, city, status, pno, qty) is defined with the FD'S (i) sno → city (ii) city→status (iii) (sno, pno) →qty.  
 1. Find the key for the schema.  
 2. Reduce it to 3NF.  
 (c) Define MVD with a suitable example.  
 (d) Explain partial and transitive dependency with an example.
9. Consider the following: (4×2)+3+4  
 (a) Hotel (hotelno, name, address)  
 Room (roomno, hotelno, type, price\_pn)  
 Booking (hotelno, guestno, date from, date to, roomno)  
 Guest (guestno, name, address).  
 Write down the expression in relational algebra.  
 (i) List all hotels in Kolkata  
 (ii) List all single rooms with a charge below Rs. 1000 per night  
 (iii) List the names of all guests who are going to stay at ITC hotel from 25<sup>th</sup> December to 1<sup>st</sup> January  
 (iv) List all guests staying at TAJ hotel.  
 (b) Write down the expression in tuple relational calculus: “List the name and address of hotels.  
 (c) Write short note on integrity constraints.
10. (a) Show that two phase locking protocol ensures conflict serializability and that transactions can be serialized according to their lock points. 7+4+4  
 (b) How can you test for serializability?  
 (c) What is ACID property of a transaction?
11. (a) What are dense and sparse indexing? Explain with an example. 4+8+3  
 (b) Create a B<sup>+</sup> tree with the following key:-  
 Order -3 keys:- 8, 5, 1, 7, 3, 12, 9, 6.  
 (c) What is view?