



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/M.Sc.(Info. Sc.)/SEM-1/MI-104/2012-13**

**2012**

**DATABASE MANAGEMENT SYSTEM**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*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 )**

1. Choose the correct alternatives for the following :  $10 \times 1 = 10$ 
  - i) SQL is a
    - a) procedural language
    - b) non-procedural language
    - c) complex language
    - d) none of these.
  - ii) The entity integrity constraint states
    - a) no primary key value can be null
    - b) a part of the key may be null
    - c) duplicate object values are allowed
    - d) none of these.
  - iii) A relation obtained from a E-R Diagram is always in
    - a) 1NF
    - b) 2NF
    - c) 3NF
    - d) PJNF.



- iv) Which of the following features is supported in relational database model ?
- a) Complex data types
  - b) Multi-valued attributes
  - c) Generalization relationships
  - d) None of these.
- v) Consider the schema R (ABCD) and Functional Dependencies  $A \rightarrow B$ ,  $C \rightarrow D$ . Then the decomposition of R into R1 (AB) and R2 (CD) is
- a) dependency preserving and lossless join
  - b) lossless join but not dependency preserving
  - c) dependency preserving but not lossless join
  - d) not dependency preserving and not lossless join.
- vi) Transaction is a
- a) program related to database
  - b) program related to networking
  - c) program written in high level language
  - d) both ( a ) and ( c ).
- vii) Shadow copy technique requires
- a) parallel transaction
  - b) serial transaction
  - c) distributed transaction
  - d) none of these.



- viii) In primary indexing we need
- record should be in any order
  - only week entity
  - record should be in order
  - composite primary key.
- ix) Join is a
- single step process
  - two step process
  - three step process
  - depend on query evaluation plan.
- x) Union compatibility is required in
- join
  - Cartesian product
  - intersection
  - none of these.

### GROUP – B

#### ( Short Answer Type Questions )

Answer any *three* of the following.

$$3 \times 5 = 15$$

2. Student

Roll No.	Name	Dept. id (FK)
1	ABC	1
2	DEF	1
3	GHI	2

Department

Dept. id	Dept. Name
1	A
2	B
3	C

What will happen if we try to execute the following two SQL statements ?

Give proper explanation for you answer.

- Update student set dept. id = 5 where roll no. = 1;
- Update department set dept. id = null where dept. id = 1;

$$2\frac{1}{2} + 2\frac{1}{2}$$



3. Prove with an example that a relation in BCNF is in 3NF, but the converse is not true.
4. What is Transaction ? Why is parallel transaction advantageous ?
5. What is indexing ? What are the differences between primary and secondary indexing ? What is multiple indexing ?

2 + 3

2 + 2 + 1

### GROUP – C

#### ( Long Answer Type Questions )

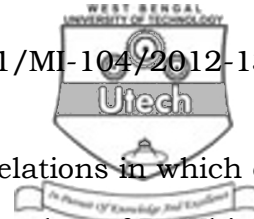
Answer any *three* of the following.

3 × 15 = 45

6. a) Let E1 and E2 be two entities in an E-R diagram with simple valued attributes. R1 and R2 are two relations between E1 and E2, where R1 is one-to-many and R2 is many-to many. R1 and R2 do not have any attributes of their own. What is the minimum number of tables required to represent the situation in the relational model ? Give proper explanation for your answer.
  - b) What is weak entity ? Give details of identifying relationship and discriminating attribute with example.
- What is specialization ?

4

1 + 3 + 1



- c) Let  $R(a, b, c)$  and  $S(d, e, f)$  be two relations in which  $d$  is the FK of  $S$  that refers to the primary key of  $R$ . Which of the following is true about the referential integrity constraint? Give proper explanation for your answer.
- Insert into  $R$
  - Insert into  $S$
  - Delete from  $R$
  - Delete from  $S$
- 4
- d) Fine out the candidate keys for the following relation  $R$  :
- $R(A, B, C, D, E, H) F = \{A \rightarrow B, BC \rightarrow D, E \rightarrow C, D \rightarrow A\}$
- 2
7. a) What is normalization? Why do we need to normalize a relation?
- 1 + 2
- b) Normalize the following relation upto BCNF.
- $R(A, B, C, D, E, F, G, H, I, J)$
- $F = \{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$
- 7
- c) What are the properties of relational decomposition? Explain.
- 5
8. a) What do you mean by canonical cover of a set of FD's? Why is it required?
- 1 + 2
- b) Find out the canonical cover for the following set of FD's :
- $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$
- 5



- c) What is deadlock ? 2
- d) Discuss two-phase locking with example. 5

9. Consider following two tables :

Student

Roll	Course	Name	Semester	Age
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Backlog

Roll	Course	Name	Semester	Age
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In student table, there are records of the entire students. In backlog table, we have info of those students who have backlog. Now do the following relation algebraic queries :

- a) Show roll and course of those students who has no backlog. 4
- b) Show roll and course of those students who has no backlog and age is more than 20. 4

Consider following two tables and do the Relational Algebraic queries :

Student

Roll	Course	Name
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Reg. no.	Roll	Course	Semester
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