

**MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL**

Paper Code : PCC-CS601/PCCCS601 Database Management Systems

UPID : 006577

Time Allotted : 3 Hours

Full Marks : 70

*The Figures in the margin indicate full marks.**Candidate are required to give their answers in their own words as far as practicable***Group-A (Very Short Answer Type Question)**

1. Answer any ten of the following :

[ 1 x 10 = 10 ]

- (i) Rectangles in ER diagram represents?
  - a) table b) attribute c) tuple d) entity set
- (ii) Which one is the fundamental operations in the relational algebra?
  - a) Natural join b) Division c) Set intersection d) Cartesian Product
- (iii) Which of the following establishes a top-to-bottom relationship among the items?
  - a) Relational schema
  - b) Network schema
  - c) Hierarchical schema
  - d) All of the mentioned
- (iv) Which of the following is not an example of DBMS?
  - a) MySQL
  - b) Microsoft Access
  - c) IBM DB2
  - d) Google
- (v) Which of the following statement is TRUE about SQL Injection?
  - a) SQL Injection is an Object Penetration Technique
  - b) SQL Injection is a Function Penetration Technique
  - c) SQL Injection is a Code Penetration Technique
  - d) SQL Injection is a Database Penetration Technique
- (vi) what is Granularity?
  - a) The size of database b) The size of data item c) The size of record d) The size of file
- (vii) Which of the following is the subset of SQL commands used to manipulate Oracle Structures, including tables?
  - a) Data Described Language
  - b) Data Retrieval Language
  - c) Data Manipulation Language
  - d) Data Definition Language
- (viii) A data dictionary does not provide information about
  - a) where data is located b) who owns it c) size of disk storage device d) how data is used
- (ix) Which of the following set should be associated with weak entity set for weak entity to be meaningful?
  - a) Neighbour set
  - b) Strong entity set
  - c) Owner set
  - d) Identifying set
- (x) Which of the following is the full form of TCL?
  - a) ternary control language
  - b) transmission control language
  - c) transaction control language
  - d) transaction central language
- (xi) Which of the following is TRUE about the type of SQL Injection attack?
  - a) Install malicious program
  - b) Export valuable data
  - c) Get user login detail
  - d) All of the above
- (xii) The values appearing in given attributes of any tuple in the referencing relation must likewise occur in specified attributes of at least one tuple in the referenced relation, according to \_\_\_\_\_ integrity constraint.

- a) Referential
- b) Primary
- c) Referencing
- d) Specific

### Group-B (Short Answer Type Question)

Answer any three of the following :

[ 5 x 3 = 15 ]

2. Discuss the ACID properties of transaction. [5]
3. Distinguish between locking and timestamp protocols for concurrency controls. [5]
4. What do you mean by heuristic based optimization? [5]
5. What do you mean by data abstraction? Discuss the role of DBA. [5]
6. Discuss different anomalies with examples. [5]

### Group-C (Long Answer Type Question)

Answer any three of the following :

[ 15 x 3 = 45 ]

7. (a) An organization purchases a items from a number of suppliers. Suppliers are identified by SUP\_ID. It keeps track of the number of each item type purchased from each supplier. It also keeps a recode of supplier's addresses. Supplied items are identified by ITEM\_TYPE and have description (DESC). There may be more than one such address for each supplier and the price charged by supplier for each item type is stored.  
Identify the entities, attributes and relationships for this organization and construct an E-R diagram. [ 8+7 ]  
b) Insert the following entries in the B tree of order 3:  
10,20,30,12,15,35,18,38,8,50
8. a) Discuss the ACID properties of transaction. [ 5+5+5 ]  
b) Describe the Wait-die and wound-wait protocols for deadlock prevention.  
c) Describe B tree with example.
9. a) Why is the optimization of a query needed? Write the different steps in query optimization. What do you mean by heuristic based optimization? [ 7+3+5 ]  
b) What is meant by Granularity of Locking ?  
c) Briefly discuss different deadlock avoidance technique in concurrent transactions.
10. Write short notes(any three) <https://www.makaut.com> [ 5+5+5 ]  
(i) Fifth normal form (ii) view (iii) trigger in database (iv) Database recovery  
(v) Different concurrency problems (vi) Two-phase locking protocol (vii) different types of failures  
viii) cursor in database
11. a) Consider the banking system in which you have to transfer Rs 500/- from account 'A' to account 'B'. Transaction T1 shows transfer of account and T2 shows sum of account A and B. Initially account A has Rs 1000/- and B has Rs 300/- [ 9+6 ]  

T1: read(A) A=A-500; Write(A) read(B) B=B+500; Write(B)	T2: read(A) read(B) display(A+B)
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 Add lock and unlock instructions to transaction T1 and T2 so that they observe the two-phase locking protocol?  
 b) Discuss about DAC and MAC.

\*\*\* END OF PAPER \*\*\*