

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/CSE(O)/SEM-5/CS-502/2012-13

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) Which is not a function of DBA ?
 - a) Schema definition
 - b) Granting of authorization for data access
 - c) Designing security
 - d) Definition triggers.
- ii) The entity integrity constraint states that
 - 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.

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[Turn over

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- iii) Which one of the following is correct ?
 - a) All functional dependencies are many-to-many relationships
 - b) All functional dependencies are many-to-one relationships
 - c) All functional dependencies are one-to-one-relationships
 - d) None of these.
- iv) What does an attribute mean ?
 - a) Property of an entity
 - b) Something about which we collect data
 - c) Something which relates the existing entities
 - d) Relation of two entities.
- v) Which of the following problems do concurrency controls deal with ?
 - a) Lost updates
 - b) Inconsistent retrievals
 - c) Uncommitted dependency
 - d) All of these.
- vi) In 2-phase locking a transaction must
 - a) release all its locks at the same time
 - b) NOT obtain any new locks once it has started releasing locks
 - c) only obtain locks on items not used by any other transactions
 - d) ensure that deadlocks will never occur.
- vii) Which one of the following is not true about a *B*-tree ?
 - a) All nodes including the root must be at least half full
 - b) All leaf nodes must be at the same level
 - c) All nodes with k keys except the leaves must have $k + 1$ descendants
 - d) The height of the tree grows when the root splits.

- viii) Which one of the following is not an indexing technique ?
 - a) Primary index
 - b) Secondary index
 - c) Multilevel index
 - d) Sequential index.
- ix) Which one of the following is true about domains in SQL ?
 - a) SQL domains are user-defined data types
 - b) SQL domains must be used in data definition
 - c) SQL domains provide strong typing
 - d) SQL domains are only synthetic shorthand for system-defined data type.
- x) Which one of the following does not always have the same list of attributes that the operands have ?
 - a) Project
 - b) Select
 - c) Union
 - d) Difference.

2. Discuss the advantages and disadvantages of using DBMS approach as compared to using a conventional file system. 5
3. Define the concept of generalization, specialization and aggregation. 5
4. What is closure and minimal cover ? What is inclusion dependency ? 3 + 2
5. What is 2-phase locking protocol ? How does it guarantee serializability ? 2 + 3

6. a) Discuss the external view, internal view and conceptual view in three-tier database architecture. How are these different schema layers related to concepts of logical and physical data independence ? 6 + 3

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- b) Write the difference between procedural and non-procedural DML. 4
- c) What do you mean by functional dependency ? 2
- 7. a) Explain the terms 'partial functional dependency' and 'non-transitive dependency' with example. 4
- b) With suitable examples show how recovery in a database system can be done using LOG file with :
 - i) immediate updation
 - ii) differed updation. 6
- c) What are the ACID properties of a transaction ? Explain. 5
- 8. a) Define BCNF. How does it differ from 3 NF ? Why is it considered as stronger than 3 NF ? 5
- b) What is metadata and what is data dictionary ? 5
- c) Explain the terms candidate key, primary key, foreign key and super key. 5
- 9. Write down short notes on any *three* of the following : 3 × 5
 - a) Time-stamp based protocol for concurrency control
 - b) Wait-Die and wound-wait protocol for dead lock prevention
 - c) B + Tree file organisation
 - d) Theta-join
 - e) Armstrong's axioms
 - f) Insertion and deletion anomalies
 - g) Vertical and horizontal fragmentation.
