

## B.Tech 5th Semester Exam., 2015

## DATABASE SYSTEMS

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
- (ii) There are **NINE** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question No. 1 is compulsory.

1. Answer any seven of the following as directed : 2×7=14

- (a) What is data abstraction?
- (b) Which of the following schemas defines a view or views of the database for particular users?
  - (i) External
  - (ii) Internal
  - (iii) Conceptual
  - (iv) None of the above

( Choose the correct answer )

- (c) Which of the following schemas defines how and where the data are organized in a physical data storage?

- (i) Internal
- (ii) External
- (iii) Conceptual
- (iv) None of the above

( Choose the correct answer )

- (d) The number of attributes in a relation is called the \_\_\_\_ of the relation. *degree*

( Fill in the blank )

- (e) In E-R diagrams, \_\_\_\_ are underlined. *Primary Key*

( Fill in the blank )

- (f) The arrow notation ( $\rightarrow$ ) in FD is read as \_\_\_\_ *dependent*

( Fill in the blank )

- (g) 4 NF is violated when a relation has undesirable \_\_\_\_ *multival attribute*

( Fill in the blank )

- (h) During the query processing, the syntax of the query is checked by \_\_\_\_.

( Fill in the blank )

(i) Which of the following is validation-based concurrency control?

- (i) Validation
- (ii) Write
- (iii) Read
- (iv) All of the above

( Choose the correct answer )

(j) Locking can be done at which level?

- (i) Page level
- (ii) Row level
- (iii) Database level
- (iv) All of the above

( Choose the correct answer )

2. (a) Who is a DBA? What are the responsibilities of DBA? 7

(b) Describe the main components of a DBMS. 7

3. (a) With example, explain how relationship and weak entities of an E-R diagram are reduced/mapped to tables. 7

(b) Draw an E-R diagram for your college. 7

4. (a) Define the structure of well-formed formula (WFF) in both the tuple relational calculus and domain relational calculus. 7

(b) What do you mean by structure of a relational model of database system? Explain the significance of domain and keys in the relational model. 7

5. (a) With example, explain superkey, candidate key, primary key and foreign key. 7

(b) What is the role of cursor in embedded SQL? Explain how it is used with example. 7

6. (a) What do you mean by assertion? Explain. 7

(b) What is functional dependency? Explain its types. 7

7. (a) Compare 3 NF with BCNF. 7

(b) Explain 4 NF. 7

8. (a) What are the typical phases of query processing? With a sketch, discuss these phases in high-level query processing. 7

(b) Explain how heuristic query optimization is performed with an example.

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7

9. (a) What is serializability? Explain view serializability.

7

(b) What are ACID properties of a database transaction? Discuss each of these properties. How do they relate to the concurrency control? Give example to illustrate your answer.

7

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