



BRAINWARE UNIVERSITY

Course – BCA

Database Management System (BCA401)

(Semester – 4)

Time allotted: 3 Hours

Full Marks : 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

10 x 1 = 10

1. Choose the correct alternative from the following

(i) If two relations R and S are joined, then the non matching tuples of both R and S are ignored in

- | | |
|--------------------|---------------------|
| a. left outer join | b. right outer join |
| c. full outer join | d. inner join |

(ii) The keyword to eliminate duplicate rows from the query result in SQL is

- | | |
|-----------------|------------------|
| a. DISTINCT | b. UNIQUE |
| c. NO DUPLICATE | d. None of these |

(iii) In 2NF

- | | |
|--|--|
| a. No functional dependencies (FDs) exist. | b. No multivalued dependencies (MVDs) exist. |
| c. No partial FDs exist. | d. No partial MVDs exist |

(iv) Relational Algebra is

- | | |
|------------------------------|------------------|
| a. Data Definition Language. | b. Meta Language |
| c. Procedural query Language | d. None of these |

(v) Which of the following protocol is used to ensure recoverable schedule?

- | | |
|---------------|---------------------------|
| a. Static 2PL | b. Strict 2PL |
| c. Basic 2PL | d. Shared-exclusive locks |

- (vi) The statement that is executed automatically by the system as a side effect of the modification of the database is
- backup
 - recovery
 - assertion
 - trigger
- (vii) A functional dependency of the form $x \rightarrow y$ is trivial if
- $y \subseteq x$
 - $y \subset x$
 - $x \subseteq y$
 - $x \subset y$
- (viii) The FD $A \rightarrow B, DB \rightarrow C$ implies
- $A \rightarrow C$
 - $B \rightarrow A$
 - $DA \rightarrow C$
 - $DB \rightarrow A$
- (ix) If both the functional dependencies $X \rightarrow Y$ and $Y \rightarrow X$ hold for two attributes X and Y then the relationship between X and Y is
- M:N
 - 1:1
 - M:1
 - 1:M
- (x) The clause *alter table* in SQL can be used to
- add an attribute
 - delete an attribute
 - alter the default values of an attribute
 - all of these

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

- Give the statement of 1NF, 2NF and 3NF. [3]
 - What do you mean by conflict equivalent schedule? [2]
- Test whether the following schedule is conflict equivalent
 $S_a : r_1(X); r_2(X); w_1(X); r_1(Y); w_2(X); w_1(Y); r_1(Y); w_1(Z); r_2(Z)$ [3]
 - What is view equivalence? [2]

4. (a) Briefly state about Atomicity and Durability properties of transaction. [2]
 (b) Discuss basic 2PL. [3]
5. Discuss briefly wait-die and wound-wait protocol of deadlock prevention. [5]
6. (a) Define primary index. [2]
 (b) How primary index differs from secondary index? [3]

Group – C

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

7. (a) Draw an ER diagram of Library Management System. Assume the necessary functionalities accordingly. Indicate the conventions used. [10]
 (b) Give an example to illustrate transitive dependency. [5]
8. (a) Discuss briefly the problems of concurrent executions. [6]
 (b) Define Deadlock. [4]
 (c) Discuss briefly how recoverable schedules can be guaranteed with 2PL. [5]
9. (a) Write down the advantages of DBMS over flat file systems. [6]
 (b) Write down the syntax of PL-SQL function. [4]
 (c) How a PL-SQL function differs from stored procedures? [5]
10. (a) Why normalization is required? [5]
 (b) Give an example relation which is in 3NF but not in BCNF. Justify your answer. [3]
 (c) In a schema with attributes A, B, C, D and E following set of functional dependencies are given
 $F = \{A \rightarrow B, A \rightarrow C, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$
 Apply Armstrong's axioms to find closure of F? Also find the candidate key(s) of the relation. [4 + 3]

11. (a) Describe Three-Schema Architecture of DBMS. [5]

(b) Consider the following relations:

author(authorid ,firstname,lastname)

authorpub(authorid,pubid,authorposition)

book(bookid,booktitle,month,year,editor)

pub(pubid,title,bookid)

Write relational algebra for the following queries.

i. Write a relational algebra expression that returns the names of all authors who are book editors.

ii. Write a relational algebra expression that returns the names of all authors who are not book editors.

[5+5]