# CS F212 – DATABASE SYSTEMS Compre Exam Answer Key

## SECTION 1 – MCQ ( 20 X 1 = 20 Marks)

1. Which of the following is not a proper state of transaction
   a) Partially aborted
   b) Partially committed
   c) Aborted
   d) Committed

2. Rollback of a transaction is normally used to
   a) Recover from transaction failure
   b) Update a transaction
   c) Retrieve the transaction
   d) Update old records

3. In a multi user database, if two users wish to update the same record at the same time, they are prevented by
   a) Jamming
   b) Documentation
   c) Record wise locks
   d) Password

4. An audit trail can be used to
   a) Restore lost information
   b) Used to make backup copies
   c) To recover the history of operations performed on the database
   d) All of the above

5. What technique is used to restore the database to the last consistent state after system failure?
   a) Backup
   b) Recovery
   c) Both a and b
   d) None of the above

6. What is in the log file in log based recovery
   a) Blocks
   b) Records
   c) Files
   d) Numbers

7. Every weak entity set can be converted to a strong entity set by
   a) Using generalization
   b) Adding appropriate attributes

    c) Using aggregation
    d) None of the above

8. An association of several entities in the entity relationship model is called
    a) Tuple
    b) Record
    c) Relationship
    d) Field

9. 4NF is used to cope with
    a) Transitive dependency
    b) Multivalued dependency
    c) Join dependency
    d) None of the above

10. 5NF is used to cope with
    a) Transitive dependency
    b) Multivalued dependency
    c) Join dependency
    d) None of the above

11 Two operations are said to be in conflict, if they satisfy _____ conditions:

a. Both the operations should belong to the same transactions, Both the operations are working on the same data items, At least one of the operations is a write operation.
b. Both the operations should belong to different transactions, Both the operations are working on different data items, At least one of the operations is a read operation.
c. Both the operations should belong to different transactions, Both the operations are working on the same data items, At least one of the operations is a write operation.
d. Both the operations should belong to the same transactions, Both the operations are working on the same data item, At least one of the operations is a read operation.
e. Both the operations should belong to different transactions, Both the operations are working on different data items, At least one of the operations is a write operation.
f. Both the operations should belong to the same transaction, Both the operations are working on different data items, At least one of the operations is a write operation.

11. _____ are the conditions to check whether the two schedules are view equivalent.

    a. Final write, Final read, Intermediate write
    b. Initial write, Initial read, Intermediate read
    c. Initial write, Final read, Intermediate write
    d. Final write, Final read, Intermediate read
    e. Initial write, Initial read, Intermediate write
    f. Final write, Initial read , Intermediate read

13 The effect of the execution of _____schedule is equivalent to the execution of a serial schedule of the transactions for every database state.
    a. Non serial

b. Parallel
c. Conflict serializable
d. View serializable

14 Consider the following schedules involving two transactions. Which one of the following statement is true?

Schedule 1: R1(X) R1(Y) R2(X) R2(Y) W2(Y) W1(X)

Schedule 2: R1(X) R2(X) R2(Y) W2(Y) R1(Y) W1(X)

a. Only S1 is conflict serializable
b. Only S2 is conflict serializable
c. Both S1 and S2 are conflict serializable
d. None

15 Find the candidate key for the given relation and its set of dependencies
Student (Id, Name, Age, Grade, DoB, Address, Contact)

Id, Name -> Age, Grade
Grade, DoB -> Address
Age -> DoB
Address -> Age
Name -> Contact

1. Grade, DoB
2. Id, DoB, age
3. Age, Grade, DoB
4. Id, Name

16 The given relation with its set of dependencies is in _____
Employee (Id, Name, Department, Salary)
Id -> Name
Name -> Department
Department -> Name, Salary
a. 1 NF
b. 2 NF
c. 3 NF
d. 4 NF

17 For the given two relation
Flower (fid, name, cid)
ContinentOfOrigin (cid, cname)

| F.fid | F.name | C.cid |
|-------|--------|-------|
| 1 | Lotus | 101 |
| 3 | Lily | 102 |
| 5 | Rose | null |

| C.cid | C.name |
|---|---|
| 101 | Africa |
| 102 | North America |
| 103 | Europe |

The given output is in _____

| F.fid | F.name | F.cid | C.cid | C.name |
|---|---|---|---|---|
| 1 | elephant | 101 | 101 | Africa |
| 3 | Lily | 102 | 102 | North America |
| 5 | Rose | null | null | null |
| null | null | null | 103 | Europe |

a. Inner Join
b. Left Outer Join
c. Right Outer Join
d. Full Outer Join
e. Cross Join
f. Self Join

18 For the given relations

Queen (id, name, age)
King (id, name, age)

To List all pairs of Queen (Q) and King (K) where the queen is younger than the king, choose the correct option

Option 1: $Q \bowtie_{Q.age<K.age} K$

Option 2: $\sigma_{Q.age<K.age} (K \times Q)$

a. Only 1
b. Only 2
c. Both
d. None

19 The given schedule faces _____ problem

| T1 | T2 |
|---|---|
| Read (A) | |
| Write(A) | |
| | Read (A) |
| | Write (A) |
| | Commit |
| Failure | |

a. Phantum Read
b. Dirty Read
c. Lost Update
d. Unrepeatable Read

20. Which of the following is correct?

    a. B-trees are for storing data on disk and B+ trees are for main memory.

    b. Range queries are faster on B+ trees.

    c. B-trees are for primary indexes and B+ trees are for secondary indexes.

    d. The height of a B+ tree is independent of the number of records.

## SECTION – 2   FILL IN THE BLANKS ( 10 X 1 = 10 Marks)

Q. 1 Swapping two _____operations in a schedule will not change the effect of the execution of the operations in a schedule

Q. 2 A schedule is called _____ if it can be transformed into a serial schedule by swapping non-conflicting operations.

Q. 3 The schedule which is conflict serializable is always _____ to one of the serial schedule.

Q. 4 S1: R1(X) R1(Y) R2(X) R2(Y) W2(Y) W1(X)
Schedule is conflict serializable (True/ False)

Q. 5 In _____, all tuples from both relations are included in the result irrespective of the matching condition.

Q.6 _____ Independence is mainly concerned with the structure or changing the data definition.

Q7. The components of storage manager in the Database system architecture are _____, _____, _____, _____ .

Q8. Consider the BPDC_Courses table.

| C_id | C_name | Credits |
|---|---|---|
| CS F111 | CP | 2 |
| CS F212 | DBS | 3 |
| CS F301 | PoPL | 4 |

How many different ways to represent the BPDC_Courses table instance (considering orders of the rows and columns) _____

Q9. Assume that there are four data disks represented as Disk_1, Disk_2, Disk_3, Disk_4 and one redundant or parity disk represented as Disk_R. Also assume that RAID level 4 (RAID4) is used and each data disk has a block of only one byte as follows:
Disk_1: 01010110     Disk_2: 11000000     Disk_3: 10111011     Disk_4: 11111011
Find the block of the Disk_R.

Q10. Assume that there are four data disks represented as Disk_1, Disk_2, Disk_3, Disk_4 and one redundant or parity disk represented as Disk_R. Also assume that RAID level 4 (RAID4) is used and Disk_1 has failed. Recover the Disk_1 block from the given values of Disk_2, Disk_3, Disk_4 and Disk_R:
10010001, 11100110, 11110011 and 00101110.

# DESCRIPTIVE TYPE – 50Marks
## SECTION A

1. ER Diagram

The academic world is an interesting example of international cooperation and exchange. This problem is concerned with modelling of a database that contains information on researchers, academic institutions, and collaborations among researchers. A researcher can either be employed as a professor or a lab assistant. There are three kinds of professors: Assistant, associate, and full professors. The following should be stored:

- For each researcher, his/her name, year of birth, and current position (if any).
- For each institution, its name, country, and inauguration year.
  For each institution, the names of its schools (*e.g. School of Law, School of Business, School of Computer Science,. . .* ). A school belongs to exactly one institution.
  An employment history, including information on all employments (start and end date, position, and what school).
  Information about co-authorships, i.e., which researchers have co-authored a research paper. The titles of common research papers should also be stored.
  For each researcher, information on his/her highest degree (BSc, MSc or PhD), including who was the main supervisor, and at what school.
  For each professor, information on what research projects (title, start date, and end date) he/she is involved in, and the total amount of grant money for which he/she was the main applicant.

**a)** Draw an E/R diagram for the data set described above. Make sure to indicate all cardinality constraints specified above. The E/R diagram should not contain redundant entity sets, relationships, or attributes. Also, use relationships whenever appropriate. If you need to make any assumptions, include them in your answer.        5M

**b)** Convert your E/R diagram from question a) into relations, and write SQL statements to create the relations.  You may make any reasonable choice of data types.  Remember to include any constraints that follow from the description of the data set for your E/R diagram, including primary key and foreign key constraints.
(4M)

2.a.  Consider the following relational schema and set of functional dependencies. List all superkey(s) for this relation. Which of these superkeys form a key (i.e., a minimal superkey) for this relation? Justify your answer in terms of functional dependencies and closures.
   R(A,B,C,D,E) with functional dependencies $AB \rightarrow E$ and $D \rightarrow C$.            3M

(b) Decompose R into BCNF. Show your work for partial credit.  Your answer should consist of a list of table names and attributes and an indication of the keys in each table (underlined attributes).                                             4M

3. Explain with a figure how a log file would look like. Consider two transactions happening in an interleaved manner. Show what happens if the data base crashes in terms of the contents of a log file and explain how the operation of undo and redo would be executed.
4M

## SECTION B

B.1.  Consider the given schedule S
a. List all the conflicting operations and determine the dependency between the transactions
**[2]**
b. Draw a dependency graph for the conflicting operations.                                **[3]**
c. Is this schedule conflict serializable? Justify your answer.                            **[2]**



B.2.  Consider the given relational schema
Intern(internid, name)
Job(internid, deptid)
Department(deptid, supervisor)

Write the relational algebra, Tuple relational Calculus and SQL for the given queries

i. What are the names of Interns in both marketing and finance?          **[1.5 X 3 = 4.5]**
ii. Who supervises at least two different departments?                   **[1.5 X 3 =4.5]**

## SECTION C

C.1. Generate a set of numbers as per the conventions given below and construct a B-Tree for them with n=3. Take last THREE DIGITS of your student ID and consider it as 'X'. Generate the set of numbers as X, X+10, X+20, X-5, X-1, X+40, X+50, X-25, X+30, X-9, X+9, X+15, X+21, X-12, X+3.  (For Example, if the student ID is 2020A7PS0**500**U, then X is 500 and the set of numbers are 500, 510, 520, 495, 499, 540, 550, 475, 530, 491, 509, 515, 521, 488, 503). Delete the elements X+30, X+21 and X+3. Show the tree stepwise.                          (5)

Q.8. For the given data, create the bitmap index for the columns Age, Weight and Height    (3)

| ID | Name | Age | Weight | Height |
|-----|------|-----|--------|--------|
| 500 | AAA | 12 | 60 | 175 |
| 501 | BBB | 15 | 65 | 155 |
| 502 | CCC | 18 | 75 | 165 |
| 503 | DDD | 12 | 60 | 150 |
| 504 | EEE | 21 | 75 | 175 |
| 505 | FFF | 30 | 60 | 145 |
| 506 | GGG | 45 | 55 | 150 |
| 507 | HHH | 45 | 60 | 155 |
| 508 | III | 21 | 55 | 165 |
| 509 | JJJ | 18 | 65 | 175 |
| 510 | KKK | 12 | 75 | 155 |

C.3. Consider the table student (Assume there are 75 rows in the table):     (6)

| Student_ID | Name | Course_ID | Marks | phone |
|---|---|---|---|---|
| 2020A7PS0501U | AAA | CSF212 | 75 | 11111111 |
| 2020A7PS0502U | BBB | CSF111 | 65 | 22222222 |
| 2020A7PS0503U | CCC | CSF301 | 55 | 33333333 |
| … | … | … | … | …… |
| … | … | … | … | ……. |
| 2020A7PS0574U | AZP | CSF007 | 80 | 34534534 |
| 2020A7PS0575U | BZZ | CSF001 | 93 | 45454545 |

Write down the cost estimates for the following queries and justify your answer.
1. Find the name of the student 2020A7PS0550U.
2. List the student IDs after 2020A7PS0550U.
3. Display the student IDs who scored 75marks and above.

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI
SECOND SEMESTER 2019 – 2020
DEPARTMENT OF COMPUTER SCIENCE

| COURSE : CS F212 – DATABASE SYSTEMS | |
|---|---|
| COMPONENT : Test 2 | WEIGHTAGE : 15% (30 Marks) |
| DATE : 08-04-2020 W2 | DURATION : 3Hrs. |

## SECTION 1 – MCQ ( 15 X 2 = 30 Marks)

1. Suppose you need to construct a B+ Tree for 66, 73, 84, 83, 80, 76, 65, 78, 68, 85 with n=3.  Choose the tree after inserting  76

2. Suppose you need to construct a B+ Tree for 66, 73, 84, 83, 80, 76, 65, 78, 68, 85 with n=3.  Choose the tree after inserting  68

3. Construct a B+ Tree first for 66, 73, 84, 83, 80, 76, 65, 78, 68, 85 with n=3.
   Then delete 84, 78 and 80.  The tree will become

4. Consider the following sequence is received as disk requests for cylinders: 95, 180, 34, 119, 11, 123, 62, 64.  Find the total seek time is required using SCAN. Assume the disk arm is moved from 52 to 50th cylinder before start processing the above requests. Also, assume that each seek takes 3ms/cylinder movement and maximum number of track is 200.

5. Consider the following sequence is received as disk requests for cylinders: 95, 180, 34, 119, 11, 123, 62, 64.  Find the total seek time is required using FCFS. Assume the disk arm is moved from 52 to 50th cylinder before start processing the above requests. Also, assume that each seek takes 3ms/cylinder movement and maximum number of track is 200.

6. A complete m-way tree can have at most 'n' children. Assume there are ten internal nodes and 41 leaves in the tree. What will be the value of 'n'?

7. Consider a game designing company develops different video games. It demands high throughput and online provisioning also. They need to recover their data in less time if there is data loss or power failure. Which RAID level you will suggest?

8. Select the statement  that is  FALSE

   A prime attribute can be transitively dependent on a key in a 3NF relation

   A relation in which every key has only one attribute is in 2NF.

   Any relation with two attributes is in BCNF.

   A prime attribute can be transitively dependent on a key in a BCNF relation.

9. Construct extendible hash index for the data given in the following table. Assume each bucket can accommodate maximum 2 records and hash value is considered from right-most to left-most bits. How many buckets will be created?

| Course Code | Hash Value |
|---|---|
| 122a | 0001 |
| 122b | 0010 |
| 122c | 0011 |
| 171 | 0100 |
| 222 | 0101 |
| 223 | 0110 |
| 241 | 0111 |
| 274 | 1000 |
| 290 | 1001 |
| 299 | 1010 |

10. Consider a main memory which has 30,000 records. A record takes 160Bytes of memory. Assume the system block size is 2048Bytes. A record size for primary index and secondary index is 15Bytes. Find the number of blocks acquired for primary index.

11. Consider a main memory which has 30,000 records. A record takes 160Bytes of memory. Assume the system block size is 2048Bytes. A record size for primary index and secondary index is 15Bytes. Find the number of blocks acquired for secondary index.

12. Given a relation R (A,B,C,D,E,F,G) with the following five functional dependencies F :

(1) $A \rightarrow BC$     (2) $E \rightarrow CF$     (3) $B \rightarrow E$     (4) $CD \rightarrow EF$     (5) $A \rightarrow G$

The closure of A:

13. Find a candidate key for R.

14. For the given schema The candidate key is (are) _____ and the schema is in _____ :

$$R(A,B,C,D,E)$$
A -> B
B-> E
C -> D

15. For the given schema The candidate key is (are) _____ and the schema is in _____ :

R(A,B,C,D,E,F)

A -> BCDEF

BC -> ADEF

DEF -> ABC

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI, DUBAI CAMPUS**

**DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI**
**SECOND SEMESTER 2019 – 2020**
**DEPARTMENT OF COMPUTER SCIENCE**

| Questions: 6 |
| Pages: 2 |

**COURSE :** Database Systems (CS F212)
**COMPONENT :** Test 1 (Closed Book)          **WEIGHTAGE :** 20%  (40 Marks)
**DATE/DAY :** 26-02-2020, Wednesday(W2)          **DURATION :** 50 Minutes
**Note**: Please write down any assumptions that you make.

| | | |
|---|---|---|
| **Q. 1** | Draw an *ER* diagram for the FLIGHT_TRAVEL database based on the following requirements. | (2+2+ 2+2) |

Each airport must be identified by unique code. Represent other details such as name of the airport, city and name. Similarly, represent customer details, airplane details, Flight_leg details such as leg_no, departure and arrival. Flight_leg is an airline industry term for a flight that maintains the same flight number and aircraft throughout its journey from one airport to another. Include separate entity sets for ticket fare and reservation.  Illustrate different types of attributes, entity sets, relationship set, cardinality and participation.

**Q.2. a.** Differentiate among a relationship instance, a relationship type, and a relationship set in ER model with an example. (2)

**b.** List any four responsibilities of database administrator. (2)

**c.** What is data dictionary? (1)

**Q. 3** Consider the table *nobel_win* with the following schema.
nobel_win(YEAR, SUBJECT, WINNER, COUNTRY, CATEGORY)

```
YEAR SUBJECT      WINNER          COUNTRY      CATEGORY
---- -------------  -----------------------  --------------  -------------------
1970 Physics       Hannes Alfven    Sweden        Scientist
```

Provided is an instance for your understanding. Here, Hannes Alfven from Sweden is a scientist who won the nobel price in the year 1970 in Physics.

**a.** Write a SQL query to show all the details of the winners with first name Louis. (1.5)

**b.** Write a SQL query to show all the details (year, subject, winner, country ) of the Chemistry prize winners between the year 1965 to 1975 inclusive. (1.5)

**c.** Write a SQL query to find all the details of the nobel winners for the subject not started with the letter 'P' and arranged the list as the most recent comes first, then by name in order. (1.5)

**d.** Write a SQL query to show all the winners of nobel prize in the year 1970 except the subject Physiology and Economics. (1.5)

**e.** Write a SQL query to show all the winners in Physics for 1970 together with the winner of Economics for 1971. (2)

**Q. 4** Let the following relation schemas be given:
R =(A,B,C)          S =(D,E,F)
Give an expression in the *tuple relational calculus* and *domain relation calculus* that is equivalent to each of the following relational algebra e:

**a.** $\sigma_{B=17}(r)$ (1+1)

**b.** $\Pi_{A,F} (\sigma_{C=D}(r \times s))$ (2+2)

**Q. 5**                                                                              (1+1+2)

Consider the following tables.

```
     student                 enrolledIn                  subject
    id  |   name              id   |   code             code  | lecturer
------------------         --------------------       ----------------------
   1234 |   joe             1234   |  cs1500          cs1500 |   curtis
   4000 | hector            1234   |  cs1200          cs2001 |   dave
   2000 |   ling            1234   |  cs2001          cs3010 |   curtis
                            4000   |  cs3010          cs2001 |   olivier
                            4000   |  ma3000          ma3000 |   roger
```

Figure out which relational algebra operations were used to obtain each of the following tables.

```
1.
 name
---------
 joe
 hector
 ling
```

```
2.
lecturer
---------
 curtis
 dave
 olivier
 roger
```

```
3.
  code  | lecturer
--------------------
 cs3010 |   curtis
 cs1500 |   Curtis
```

There are two ways to get this table. Try to list both. *Hint*: Use an OR in the selection condition for one method.

**Q6.  a.**  Give the following queries in the *relational algebra* using the relational schema             (2+2+2)
student(id, name)
enrolledIn(id, code)
subject(code, lecturer)
1. Who teaches at least two different subjects?
2. What are the names of students in cs1500 or cs3010?
3. What are the names of students in both cs1500 and cs1200?

**b.**  Represent the following using *EER* diagram representation.                                          (3)
A Company interacts with Suppliers and Customers. A person could belong to only any one of the categories not both. A customer signs an agreement with the company. The agreement may either be a long-term contract or a one-time order and not both. Use only the required identifying attributes.

********** ALL THE BEST *********

| COURSE : CS F212 – DATABASE SYSTEMS | |
|---|---|
| COMPONENT : Quiz1 DATE : 17-03-2020 | WEIGHTAGE : 05% (10 Marks) |

## SECTION 1 – MCQ ( 10 X 1 = 10 Marks)

1. The default syntax for date in MySQL is
   a. mm-dd-yyyy
   b. mm-yyyy-dd
   c. yy-mm-dd
   d. yyyy-mm-dd
2. With SQL, how do you select all the columns from a table named "Persons"?
   a. SELECT Persons
   b. SELECT * FROM Persons
   c. SELECT [all] FROM Persons
   d. SELECT *.Persons
3. What is the following assertion doing?

```
create assertion sum-constraint check
    (not exists (select *
            from branch
                where (select sum(amount)
                 from loan
                        where loan.branch-name =
                    branch.branch-name)
                 >= (select sum(amount)
                from account
                        where loan.branch-name =
                    branch.branch-name)))
```

a. The sum of all loan amounts for each branch must be greater than the sum of all account balances at the branch.

b. The loan amounts for each branch must be less than the sum of all account balances at the branch.

c. The sum of all loan amounts for each branch must be less than the sum of all account balances at the branch.

d. The sum of all loan amounts for each branch must be greater than the account balances at the branch.

4. Consider the following tables schema

Table (Name, No, People, OrderNo)

Orders (OrderNo, DishesNo, Time, Amount)

Which JOIN clause will select all the records from the Table table plus all the matches in the Orders table.

SELECT *

FROM

_____

ON Orders.OrderNo=Table.OrderNo;

    a. Orders LEFT JOIN Table
    b. Orders RIGHT JOIN Table
    c. Orders FULL JOIN Table
    d. Orders INNER JOIN Table

5. SELECT statement can be used to display ____
a) One column
b) One or more tables
c) Only one table
d) None of the above

6. Consider two tables 'A' & 'B'. If A is joined with B, then the unmatched rows will be eliminated in

a. left outer join b. right outer join

c. full outer join d. inner join

Consider the following relations for the questions 7,8,9 & 10. Choose the correct option.

       Restaurant(Rest_ID, Rname, address)

       Food(F_ID, F_name, Type)   (Assume the field 'Type' will take value either 'Veg' or 'NonVeg'.

       Menu(Rest_ID, F_ID, price)

7. For each Food item, display the name of the restaurant who charges the most for that food.

| A. | B. |
|---|---|
| SELECT F.F_id, R.Rname | SELECT F.F_id, R.Rname |
| FROM Food F, Restaurant R, Menu M | FROM Food F, Restaurant R, Menu M |
| WHERE M. F_id = F. F_id | WHERE M. F_id = F. F_id |
| AND M.Rest_ID = R. Rest_ID | AND M.Rest_ID = R. Rest_ID |
| AND M.price = (SELECT M1.price | AND M.price = (SELECT MAX (M1.price) |

| | |
|---|---|
| FROM Menu M1<br><br>    WHERE M1.F_id = F.F_id); | FROM Menu M1<br><br>    WHERE M1.F_id = F.F_id); |
| C.<br>SELECT F.F_id, R.Rname<br>FROM Food F, Restaurant R, Menu M<br>WHERE M. F_id = F. F_id<br>AND M.price = (SELECT MAX (M1.price)<br>FROM Menu M1<br>    WHERE M1.F_id = F.F_id); | D. None of these |

8. Display only the vegetarian restaurants.

| A. | B. |
|---|---|
| SELECT DISTINCT M.Rest_ID<br>FROM Menu M<br>WHERE NOT EXISTS ( SELECT *<br>FROM Food F<br>WHERE F.F_ID = M.F_ID AND F.Type = 'Veg'<br>); | SELECT DISTINCT M.Rest_ID<br>FROM Menu M<br>WHERE NOT EXISTS ( SELECT *<br>FROM Food F<br>WHERE F.F_ID = M.F_ID AND F.Type <> '<br>NonVeg' ); |
| C.<br>SELECT DISTINCT M.Rest_ID<br>FROM Menu M<br>WHERE NOT EXISTS ( SELECT *<br>FROM Food F<br>WHERE F.F_ID = M.F_ID AND F.Type <> '<br>Veg' ); | D. None of these |

9. Display the food names for which there is some restaurant.

| | |
|---|---|
| SELECT DISTINCT F.F_name<br>FROM Food F<br>WHERE F.F_ID = M.F_ID; | SELECT  F_name<br>FROM Food; |
| SELECT DISTINCT F.F_name<br>FROM Food F, Menu M<br>WHERE F.F_ID = M.F_ID; | D. None of these |

10. Display the food names provided by the restaurant "Saravana Bavan" and no one else.

| A. | b. SELECT F.F_name |
|---|---|
| SELECT F.F_name | FROM Food F, Menu M, Restaurant R |
| FROM Food F, Menu M, Restaurant R | WHERE F.F_ID = M.F_ID AND M.Rest_ID = R.Rest_ID |
| WHERE F.F_ID = M.F_ID AND M.Rest_ID = R.Rest_ID | AND R.Rname = 'Saravana Bavan' |
| EXISTS ( SELECT * | AND NOT EXISTS ( SELECT * |
| FROM Menu M1, Restaurant R1 | FROM Menu M1, Restaurant R1 |
| WHERE F. F_ID = M1.F_ID AND M1. Rest_ID = R1. Rest_ID AND | WHERE F. F_ID = M1.F_ID AND M1. Rest_ID = R1. Rest_ID AND |
| R1.Rname <> 'Saravana Bavan) | R1.Rname <> 'Saravana Bavan) |
| c. SELECT F.F_name | D. None of these |
| FROM Food F, Menu M, Restaurant R | |
| WHERE F.F_ID = M.F_ID AND M.Rest_ID = R.Rest_ID | |
| AND R.Rname = 'Saravana Bavan'; | |