Database Concepts

PART 1
Objective Questions

• Multiple Choice Questions

1. DBMS stands for
(a) Database Microsoft System
(b) Database Migration System
(c) Database Management System
(d) None of the above

Ans. (*c*) DBMS is the short form of Database Management System. It refers to a category of softwares that store and manage bulk volumes of data.

2. A table can have ..... primary key(s).
(a) 1 (b) 2
(c) 3 (d) multiple

Ans. (*a*) A table can have only a single primary key to identify the records.

3. Which of the following is not a DBMS?
(a) MS-Word
(b) MySQL
(c) Oracle
(d) Microsoft SQL Server

Ans. (*a*) MySQL , Oracle and Microsoft SQL Server are all DBMS but MS-Word is a documentation software.

4. The total number of columns in a table is called
(a) cardinality (b) degree
(c) spreadsheet (d) relation

Ans. (*b*) The term degree refers to the total number of columns in a table.

5. Tables can be linked by
(a) primary key (b) candidate key
(c) alternate key (d) foreign key

Ans. (*d*) A foreign key is a common field found in two tables and it links the two tables.

6. The total number of rows in a table is called
(a) domain (b) tuple
(c) field (d) cardinality

Ans. (*d*) The total number of rows in a table is called cardinality.

7. If we delete an attribute of a table
(a) degree increases
(b) cardinality increases
(c) degree and cardinality increase
(d) degree decreases

Ans. (*d*) Degree is the total number of attributes/columns in a table , so if a column is deleted the degree decreases.

8. Raj wants to make EmpNo and PFNo columns of his table as the primary key. Is it possible?
(a) Yes
(b) No
(c) Yes , possible as a comination of columns
(d) None of the above

Ans. (*c*) Two columns cannot be primary key. But a combination of the columns can be primary key.

9. Software that is used to create , manipulate , maintain a relational database management system is called **(NCERT)**
(a) documentation software
(b) spreadsheet software
(c) RDBMS
(d) designing software

Ans. (*c*) A Relational Database Management System (RDBMS) is a software that can be used to maintain , manipulate and create large volumes of data in relations/tables and relationships between them.

10. In a relational data model, a data structure that organises the information about a single topic into rows and columns is
(a) block (b) record (c) tuple (d) table

Ans. (*d*) The tables stores the individual domains of data of a database system and thus stores the data and organises it.

11. Which of the following is the drawback of DBMS?
(a) Improvement in data
(b) Backup and recovery
(c) Complexity
(d) Maintenance of data integrity

Ans. (*c*) The complex structure of tables , the relationships between them , other database objects and their management is what makes database systems complex and specialised software and people to manage. Database systems are complex, difficult and time-consuming to design.

12. Which of the following component of database system consists of various secondary storage devices on which data is stored?
(a) Hardware (b) User (c) Data (d) Software

Ans. (*a*) The permanent or secondary storage device is the hard disk or any kind of disk storage that resides in the hardware unit.

13. In files, there is a key associated with each record which is used to differentiate among different records. For every file, there is atleast one set of keys that is unique. Such a key is called
(a) unique key (b) prime attribute
(c) index key (d) primary key

Ans. (*d*) A primary key carries unique values and hence is used to identify the records uniquely.

• Case Based MCQs

Direction *Read the case and answer the following questions.*

14. Anita has created a table "Players" to store the details of players who play in her sports academy . She has planned to create the following table with columns :
PlayerId, PlayerName , Game, Type , AadharNo

Table : Players

PlayerId	PlayerName	Game	Type	AadharNo
P01	Becker	Tennis	Indoor	333444657
P02	Robin	Tennis	Indoor	192900877
P03	Sunetra	Football	Outdoor	214567432
P04	Rakhi	Cricket	Outdoor	111231896

Answer the following questions, which based on the given information.

(i) Which column can she make the primary key?
(a) PlayerId (b) PlayerName
(c) Game (d) Type

(ii) Which column(s) can act as candidate key?
(a) Only PlayerId (b) Only AadharNo
(c) Both (a) and (b) (d) Type

(iii) Which column is the foreign key in the table?
(a) PlayerName (b) Type
(c) Game (d) None of these

(iv) What is the degree of the table?
(a) 1 (b) 2 (c) 3 (d) 5

(v) What will be the cardinality of the table, if two columns are added to the table?
(a) 7 (b) 6
(c) 4 (d) None of these

Ans. (i) (*a*) The PlayerId column stores unique and non-blank values , hence it can serve as primary key.

(ii) (*c*) All the field combinations that can serve as primary key for unique identification of records in a table are called candidate keys. Here PlayerId and AadharNo can serve as primary key.
So, these fields can act as candidate keys.

(iii) (*d*) The concept of foreign key is relevant only when there are multiple tables.

(iv) (*d*) Degree of a table is the total number of columns, i.e. 5.

(v) (*c*) The total number of rows in a table is its cardinality, i.e. 4. Adding columns to table increases its degree not cardinality.

15. Mr. Sharma is a new user of database systems . He has created a table storing the details of staff in his office. He is confused about some of the terms related to tables and databases. Help him solving his confusions.

Table : Staff

StaffId	StaffName	Dept	Salary	PF AcNo
1	Mrs. Fernandes	Accts	19500	UP/1108
2	Mr. Das	Sales	45000	WB/6777
3	Ms. Sunita	IT	65000	CH/0097
4	Mr. Roy	Accts	25000	WB/4567

(i) The vertical set storing the departments under the heading "Dept" is called
(a) field (b) attribute
(c) column (d) All of these

(ii) What is the cardinality of the table?
(a) 2 (b) 3 (c) 4 (d) 1

(iii) Can "StaffName" column serve as primary key?
(a) No
(b) Yes, only if it stores non-blank and distinct names
(c) Yes, only if it stores only distinct names
(d) Yes

(iv) A tuple carries
(a) a single value
(b) double values
(c) a row of multiple values as a record
(d) None of the above

(v) An attribute which can uniquely identify tuples of the table but is not defined as primary key of the table is called **(NCERT)**
(a) primary key (b) alternate key
(c) forign key (d) None of these

Ans. (i) (*d*) The vertical columns of table are also called fields or attributes.

(ii) (*c*) Cardinality means the number of rows in a table, i.e. 4.

(iii) (*b*) The primary key of a table has to be unique and NOT NULL .

(iv) (*c*) A tuple is a horizontal row or record storing all the details of an entity.

(v) (*b*) All the candidate key fields that are not primary key are alternate keys. In a table there can be multiple such fields who can serve as primary key. Such fields are called candidate keys. Among these any one serves as primary key. The rest of the candidate keys are called alternate keys.

PART 2

Subjective Questions

• Short Answer Type Questions

1. What do you understand by the term database?

Ans. A database is a huge collection of data accumulating in a particular system. It comprises of historical data, operational and transactional data. The database grows everyday with the transactions dealing with it.

A database has the following properties

(i) It is a collection of data elements representing real-world information.

(ii) It is logical, coherent and internally consistent.

2. What is a DBMS? Expand and explain in short.

Ans. A Database Management System is a software system that enables users to define, create and maintain the database and provides controlled access to this database.

The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient. Data in a database can be added, deleted, changed, sorted or searched, all using a DBMS.

3. What is a table? Also,write the other name of table.

Ans. Table is also called a relation, it is a diagrammatically a matrix of rows and columns that store the data of a particular system. A table is just like a sheet in Excel, that stores data in some columns and rows.The data is arranged under some fields, where each field stores similar kind of data.

4. What do you mean by fields of a table? Give examples.

Ans. A field of a table is simply a vertical column of the table. A field is also called an attribute. It stores similar kind of data. e.g. Name,Class ,Marks etc., can be fields of student table, EmpId, Empname,Dept can be fields of Employee table. Each field derives its values from a pool of data which is called as the domain. All the values in a single field will be of same data type.

5. What are records? Also, write the other name of record.

Ans. A record is a horizontal row of a table storing complete data of one entity. It is also called a tuple.

e.g.

2	Mr. Das	Sales	45000

The above record of Mr. Das carries all the information about him. Similarly other records of the table carry data about other employees.

All the records together make up the data of the table.

6. What do you understand by the term degree of a table? Can it change?

Ans. The term degree refers to the total number of columns in a table. Yes the degree changes with addition or deletion of columns.

e.g. If a table "Product" stores the data in columns "PNo, PName,Qty,Price", there are 4 columns , hence the degree will be 4.

7. What do you understand by the term cardinality of a table? How can it be modified?

Ans. The total number of rows of a table is called the cardinality. It gets modified by the addition or deletion of rows. If rows are added to the table the cardinality increases . If rows are deleted the cardinality decreases.

8. What is a primary key? How many primary keys can be there in a table?

Ans. It is a combination of one or more fields in a table that can uniquely identify a record. There can be only one primary key in a table. It plays an important role in identifying the records, because it is the primary key who carries unique values. The criteria for a field to become primary key is : It must be carrying unique and NOT NULL values.

9. What is candidate key?

Ans. All the field combinations that can serve as primary key for unique identification of records in a table are called candidate keys.

For example, If a student table carries "RollNo., Name, Class, AadharNo., AdmissionNo" columns, then columns RollNo., AadharNo. and AdmissionNo can become the candidate keys since all carry unique values.

10. Can we have multiple candidate keys in a table? Give example.

Ans. Yes, we can have multiple candidate primary keys.
e.g. In an Employee table, ENo and AadharNo both can serve as primary key, hence both are candidate keys. Only primary key in a table will be a single field , candidate keys can be multiple.

11. Which fields are regarded as alternate keys?

Ans. All the candidate key fields that are not primary key are alternate keys.

e.g. If a table Employee carries columns "ENo,EName,PFNo,VoterId", then "ENo" is set as primary key and the other candidate keys "PFNo" and "VoterId" will be the alternate keys.

12. Why foreign keys are allowed to have NULL values? **(NCERT)**

Ans. A foreign key is a field that links two tables . A table may have links to multiple tables . Each link is supported by a value that is common in the two tables . If there is a missing foreign key value for a record , it means the link is missing and no matching values are present. This is perfectly a valid situation, not an error .

13. How many foreign keys can be there in a table?

Ans. A table can have multiple foreign keys depending on the number of tables to which the mother table has links.

Multiple tables can be linked by the foreign key which will be common in all of them . It is by the foreign key that the corresponding values will be obtained from the tables.

14. Write names of few softwares used as DBMS.

Ans. MySQL, Oracle , DB/2, Ingres softwares obey certain common rules of relational algebra. Like they all support most of the codd's rules and support SQL . Some of these softwares like MySQL are free and some like Oracle is proprietary, that it has to be bought.

15. What do you understand by the term domain?

Ans. Domain refers to the pool or set of values from which a field of a table derives its values. e.g. The RollNo field derives its values from the set of integers from 1-100 (approx.). The "Dept" field derives its values from the domain of possible departments and the "Marks" field derives its values from the range of marks in an examination.

16. Give suitable example of a table with sample data and illustrate primary and candidate keys in it.

Ans. **Candidate Key** It is a set of all attributes that uniquely identifies records in a table. Each table may have one or more candidate keys.

Table : Student

AdmNo	RollNo	Name	Class	Marks
2715	1	Rame	12	90
2816	2	Shyeam	11	95
2404	3	Ajay	10	92
2917	4	Tarun	12	94

e.g. In Student table, AdmNo and RollNo both can identify records uniquely. So, both are candidate key.

Primary Key It is a set of one or more attributes that can uniquely identify each tuple of a relation. A relation can have only one primary key.

e.g. In Student table, AdmNo of all students are different. So, we have created AdmNo as primary key.

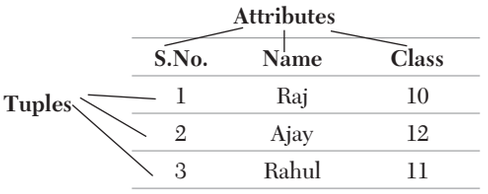
17. List some commonly used DBMS software packages.

Ans. Some commonly used DBMS software packages are

(i) MySQL (ii) Oracle
(iii) Postgre (iv) DB2
(v) MS-SQL (vi) Sybase

18. Differentiate between an attribute and a tuple with an example.

Ans. The columns of a table are referred to as attributes. It is also known as field which is reserved for a specific piece of data. The rows of a table are referred to as tuples.



19. What is the difference between degree and cardinality of a table? What is the degree and cardinality of the following table?

Eno	Name	Salary
101	John Fedrick	45000
103	Raya Mazumdar	50600

Ans. **Degree** The number of attributes or columns in a table is called the degree of the table.

The degree of the given table is 3.

Cardinality The number of rows or records in a table is called the cardinality of the table. The cardinality of the given table is 2.

20. Mention atleast three limitations of DBMS.

Ans. Some limitations of DBMS are given below

(i) **High Cost** DBMS requires various software, hardware and highly intelligent people for operating and maintaining the database system. It increases its cost.

(ii) **Database Failure** If database is corrupted due to power failure or any other reason, our valuable data may be lost or whole system stops.

(iii) **Data Quality** With increased number of users accessing data directly. There are enormous opportunities for users to damage data. So, it is not easy to provide a strategy to support multiple users to update data simultaneously.

• Long Answer Type Questions

21. Explain the role of database management system in maintaining huge volumes of data of different domains. Explain your views using an example.

Ans. A database management system is a specialised software that helps maintain large volumes of data pertaining to a real life system . Examples of such systems include business houses , transport systems, libraries , schools etc.

It not only stores bulk data in structured way but also helps to add , modify ,search , update and delete data from such databases. Examples of DBMS softwares are MySQL , Microsoft SQL Server , Oracle etc.

Application program accesses the data stored in the database by sending request to the DBMS.

For example, MySQL, INGRES, MS-ACCESS etc.

The purpose of a Database Management System is to bridge the gap between information and data. The data stored in memory or on disk must be converted to usable information.

22. A table "Sports" exists with 3 columns and 5 rows. What is its degree and cardinality? 2 rows are added to the table and 1 column deleted. What will be the degree and cardinality now?

Ans. The term degree refers to the total number of columns in a table. The term cardinality refers to the total number of rows in a table.

Initially, Sports table has 3 columns and 5 rows, so

Degree : 3

Cardinality : 5

After operations, 2 rows are added to the table and 1 column deleted.

Now, degree : 2 cardinality : 7.

23. Differentiate the terms primary key and candidate key.

Ans. Differences between primary key and candidate key are

Primary key	Candidate key
A primary key is a single field in a table that is used to identify the records uniquely.	A candidate key is a set of columns who are eligible for unique identification of records.
Only one field among the candidate keys is selected as primary key.	A table can have multiple candidate keys.
Primary key of a table is used in linking the data of the table to another table.	Candidate keys do not have such role.

24. Explain by an example how foreign key is useful for bringing data from multiple tables?

Ans. Consider the two tables given below

Table : Student

RollNo	Name	Class	Marks	AddressID
1	Rohan	12ScA	78.5	A1
2	Smita	11ComC	67.7	A2
3	Priya	12HumA	82.6	A3

Table : Address

AddressID	Place	State	Contact
A1	Pahargunj	Delhi	9876745655
A2	Kolkata	WB	9434566778
A3	Barnala	Punjab	9433534038

Referring to the above tables , if we look for Place to which "Priya" belongs" , we can link the tables by the foreign key "AddressID" of the Student table to get place as "Barnala" by the AddressID "A3". So, a foreign key helps in bringing data from multiple tables.

Chapter Test

Multiple Choice Questions

1. The other name for a table is
(a) database (b) relation
(c) domain (d) degree

2. A DBMS is used for
(a) designing (b) image merging
(c) compression of file (d) None of these

3. Special value that is stored when actual data value is unknown for an attribute. **(NCERT)**
(a) None (b) NULL
(c) NaN (d) None of these

4. The foreign key of a table
(a) has unique values
(b) has integer type values
(c) has a linking column in another table
(d) None of the above

5. The number of rows of a table is
(a) limited
(b) not limited
(c) can be restricted while table creation
(d) None of the above

Short Answer Type Questions

6. What is the use of foreign key field?

7. What are the components of a database system?

8. Can a primary key be alternate key?

9. While creating a table Rahul has restricted duplicate values in one of the columns. Can he make the column as primary key? Justify your answer.

10. Explain the term relation.

Long Answer Type Questions

11. Considering the following tables

Table : STUDENT

RollNo	Name	Class	Section	Registration_ID
11	Mohan	XI	1	IP-101-15
12	Sohan	XI	2	IP-104-15
21	John	XII	1	CS-103-14
22	Meena	XII	2	CS-101-14
23	Juhi	XII	2	CS-101-10

Table : PROJECT

ProjectNo	PName	Submission_Date
101	Airline Database	12/01/2018
102	Library Database	12/01/2018
103	Employee Database	15/01/2018
104	Student Database	12/01/2018
105	Inventory Database	15/01/2018
106	Railway Database	15/01/2018

Table : PROJECT ASSIGNED

Registration_ID	ProjectNo
IP-101-15	101
IP-104-15	103
CS-103-14	102
CS-101-14	105
CS-101-10	104

Answer the questions, which based on above information.

(i) Name primary key of each table.

(ii) Find foreign key(s) in table PROJECT ASSIGNED.

(iii) Is there any alternate key in table STUDENT? Give justification for your answer.

(iv) Can a user assign duplicate value to the field RollNo of STUDENT table? Jusify.

12. An organisation wants to create a database EMP_DEPENDENT to maintain following details about its employees and their dependent.

EMPLOYEE(AadharNumber, Name, Address, Department,EmployeeID)

DEPENDENT(EmployeeID, DependentName, Relationship)

(i) Name the attributes of EMPLOYEE, which can be used as candidate keys.

(ii) The company wants to retrieve details of dependent of a particular employee. Name the tables and the key which are required to retrieve this detail.

(iii) What is the degree of EMPLOYEE and DEPENDENT relation?

13. What are the major components of a database system?

14. Differentiate the terms DBMS and RDBMS.

15. In a multiplex, movies are screened in different auditoriums. One movie can be shown in more than one auditorium. In order to maintain the record of movies, the multiplex maintains a relational database consisting of two relations *viz*. CINEMA and PEOPLE respectively as shown below:

CINEMA(Movie_ID, MovieName, ReleaseDate)

PEOPLE(AudiNo, Movie_ID, Seats, ScreenType, TicketPrice)

(i) Is it correct to assign Movie_ID as the primary key in the CINEMA relation? If no, then suggest an appropriate primary key.

(ii) Is it correct to assign AudiNo as the primary key in the PEOPLE relation? If no, then suggest appropriate primary key.

(iii) Is there any foreign key in any of these relations?

Answers

Multiple Choice Questions

1. *(b)* ***2.*** *(d)* ***3.*** *(b)* ***4.*** *(c)* ***5.*** *(b)*