Database Management System (SAZ5A/SAE5A)

1. **Define data dependence.**
   - **a.** Focusing on the data is the separation of the data definition from the program known as data dependence**.**
2. **Define: OLAP**
   - a. Online Analytical Processing
   - b. It provide special designs and tools support
3. **What are steps involved in database design?**
   - a. Identify the exact goals of the system
   - b. Identify data items to be stored
   - c. Identify any business constraints
4. **Define: primary Key**
   - a. It is a set of columns that identifies a particular row
   - b. Primary key is a unique key.
5. **Difference between super key an foreign key.**
   - a. Super key – compination of columns that uniquely identifies any row within a relational database management system
   - b. Foreign key – it is a field in one table that uniquely identifies a row of another tables or the same table.
6. **Define : Canidate Key**
   - a. A candidate key is a closely related concept of superkey is reduced to the minimum number of columns required to uniquely identify each row.
7. **What are development issues on large projects?**
   - a. Communication with multiple users
   - b. Communication between IT workers.
   - c. Need to monitor design process
8. **Define : Composite key**
   - a. Use more than one column as part of the primary key . these are called composite key.
9. **Define : BCNF**
   - a. BCNF – Boyce-codd Normal Form
   - b. Real world situations , writers realized that additional problems could occur some situations . codd ‘s initial formal definition of 3NF was probably too narrow.
10. **Define : DKNF**
    - a. Domain Key Normal Form
    - b. The ultimate goal in designing a database.
    - c. Different approach to normalized tables.

11. Define : Data Dictionary

a. The data dictionary holds the definition of all the tables. A data dictionary contain design information, user permissions etc.,

12. **Define normalization**.

a. Normalization is a process of organizing data in a database. It eliminates redundant data.

13. What are the uses of forms?

a. Collect data
b. Display query results
c. Display analysis and computations
d. Direct manipulation of objects

14. List out the human factors in form design.

a. User control , consistency, clarity, aesthetics, feedback, forgiveness

15. What is the window components used in DBMS?

a. Frame , title bar, control menu box, buttons,

16. **List out the types of forms**.

a. Tabular forms
b. Single row/column form
c. Subform
d. Switchboard form

17. List out the types of reports.

a. Tabular reports
b. Label reports
c. Groups reports
d. Subtotals reports

18. Define optimistic lock.

a. It begins with the assumption that collisions are rare and unlikely arise.

19. What is process involved in optimistic lock?

a. Read the balance
b. Add the new order value
c. Write the new balance
d. Check for errors.

20. Define: ACID transactions

a. Atomicity – all changes succeed
b. Consistency – all data remain internally consistent
c. Isolation – the system gives each transaction
d. Durability – when a transaction is committed, all changes are permanently saved.

21. Define : ETT

a. ETT – extraction, transformation, transfortation

b. Cleaning and transferring data is often the most difficult part of establishing a data warehouse.

22. Define: snaowflake design

a. More lenient definition in that the dimensions tables may connect through other tables before being joined to the fact table.

23. What is cluster analysis?

a. Used to identify grouping of data, data points that tend to be related to each other.

24. What are the DDL commands used in SQL?

a. Create, alter , drop, truncate

25. What are the DML commands used in SQL?

a. Insert, delete , select, update

26. Define: database.

a. Database is a collection of data stored in a standardized format, designed to be shared by multiple users.

27. Define: DBMS

a. It is a software that defines a database, stores the data, support a query language, produces reports, and creates data entry screens.

28. What is metadata?

a. Data about is data
b. A system table contains a list of all the user tables

29. What is the development stages involved in database tasks?

a. Database planning
b. Database design
c. Database implementation
d. Database operation and maintenance

30. Define : composition

a. The simple aggregation indicator is not used much in business settings .
b. Composition is a stronger aggregate associations that arise more often.
c. The individual items became new object.

31. Define: aggregation

a. Some special types of associations arise often enough that UML has defined special techniques for handling them

Section B(5 marks)

32. Discuss about advantages of DBMS.

a. Minimal data Redundancy
    i. Redundancy means repetition
    ii. By controlling data redundancy, we can save storage space.
b. Data consistency
    i. Maintains data consistency with minimal effort.

ii. Basic business rules are easily created.

c. Integration of data
   i. Since data in databases is stored in tables.
   ii. Data can be retrieved, combined and compared using query system.
d. Ease of application development
   i. The cost and time for developing new applications is also referred.
e. Uniform security, privacy and integrity
   i. Centralized control and standard procedures can improve data protection in DBMS.

33. Explain cost and benefits of feasibility study.

a. The goal of a feasibility study is to determine whether a proposed project is worth pursuing. Feasibility study is divided into costs an benefits.
   i. Costs:
      1. Costs are divided into up-front or one-time costs and ongoing costs.
      2. Upfront(or)one-time costs:
         a. Software
         b. Hardware
         c. Communication
         d. Data conversion
      3. Ongoing costs:
         a. Personal
         b. Supplies
         c. Support
         d. Software upgrade
b. Benefits:
   i. Benefits are divided into cost savings, increased value and strategic advantages.
      1. Software maintenance
      2. Fewer errors
      3. Loss data maintenance
      4. Less user training

34. How to convert class diagram into normalized table?

a. A class diagram is a visual model of the classes and associations.
b. Three basic types of relationship exit among class
   i. One –to – One
   ii. Many –to – One
   iii. One –to –Many
   iv. Many –to –many
c. Converting one-to-many relationship

i. Add the primary key from one side into many side

Department	1:N	student

One –to- Many

Department Table

Dept Id	Dept Name

Student Table

Stud id	Stud Name	Deptid

35. What is the Aggregate Function used in DBMS.

a. SQL is very powerful high-level language and is very flexible.
b. AVG()
    i. To find average of a particular column in a record.
    Select avg(Salary) from employee;
c. COUNT()
    i. To counts the record of a table
    Select count(name) from employee where dept=”maintenance”
d. SUM()
    i. To find sum of a particular field.
    Select Sum(Salary) from employee;
e. MAX()
    i. To find maximum value in a particular column.
    Select Name, MAX(Salary) from employee;
f. MIN()
    i. To find minimum value in a particular column.
    Select Name, Min(Salary) from employee;

36. **Explain about procedural language**.

a. It specifies the sequence of set of commands. Every procedural language contains own set of elements. Programming contains two basic components
    i. Logic
    ii. Syntax
b. Logic
    i. Programming logic explains the way in which the problem is solved on the structure of the program.
c. Syntax:

i. Syntax refers to the commands and features in the programming language. Variables, Computation, Standard Functions, Debug, Input, Output, Loops and array.

d. PL/SQL:
   i. We can retrieve data from tables using select statement and apply it into some variables.
   ii. Structure of PL/SQL
      1. Declare
         a. <Declaration Section>
      2. Begin
         a. <body of the program>

         End

   iii. Declare Variable
      1. Syntax:
         a. <var-name><var-type>
      2. Example:
         a. Student_Mark number;

37. Discuss about error handling.

a. To handle those errors to avoid the termination of the PL/SQL program. This technique is called as exception handling or error handling.
b. Predefined exception or Built in function
   i. Stu_Mark1 number student.Mark%type;
   ii. Stu_Mark2 number student.Mark%type;
   iii. Stu_total_Mark number=0;
   iv. Stu_Avg number=0;

```
Begin
Select Mark1 into Stu_Mark1 from student where name='xxx';

Select Mark2 into Stu_Mark2 from student where name='xxx';

Stu_total_mark=Stu_Mark1+Stu_Mark2;

Stu_Avg=Stu_total/2;

Print stu_avg

Exception

When ZERO-DIVIDE then

Print("trying to divide by zero");
End;
```

38. Explain about SUBTOTAL and GROUBBY commands.

a. Subtotal
   i. Subtotal statements can be used for retrieving the computed values without any problems.
   ii. Example : Select name, Salary+1000 As Bonussalary from employee

Name	Salary
Xxx	5000
Yyy	7000
Zzz	8000

Name	Salary
Xxx	6000
Yyy	8000
Zzz	9000

a. GroupBy
   iii. GroupBy command is used to group the records or rows based on same criteria.
   iv. Example : Select name, avg(Salary) from employee

Name	**Salary**
Ram nirmal	9000

Name	**salary**
Abi Sneha	21000

Name	**Salary**
Anu Jones	15,000

Name	**Deparment**	**Salary**
Ram	Clerical	10,000
Seethe	Engineering	20,000
Anu	System	18,000
nirmal	Clerical	8,000
jones	System	12,000
Sneha	Engineering	22,000

39. Discuss about sub queries.

a. Sub query is also called inner query or nested query, a query which is written inside another query.
b. Sub query will return value that will be used by other query.
c. Sub queries can use insert, update, select, delete, operators, orderby etc.
d. Sub query is enclosed within paranthesis.

Employee table

Emp-Name	Dept_id
nirmal	31
Jones	33
Swetha	33
Robinson	34
Sneha	34
john	Null

department table

Dept-id	Dept-name
31	Sales
33	Engineering
34	Clerical
35	Marketing

Select*from employee where dept-id IN(select dept_id from Department)

Emp-Name	Dept_id
nirmal	31
Jones	33
Swetha	33
Robinson	34
Sneha	34

40. How to write a program to retrieve and save data.

a. Updation of data
    i. The database is updated by collecting information and changing the values in the table
b. Insertion of data
    i. New record to be stored in database tables
c. Deletion of data

i. Deletes the record from the database tables.

41. Discuss about backup and Recovery.

a. Backup
   i. A backup is a copy of data
   ii. This copy can include parts of the database such as the control files and datafiles.
   iii. A backup is a safeguard against unexpected data loss and application errors.
   iv. If you loss original data, then you can reconstruct it by using a backup.
b. Recovery
   i. To restore a back of a file to reconstruct it and make it available to the oracle database server.
   ii. To recover a restored datafile is to update

42. Discuss about Security and Privacy.

a. Security
   i. There are two basic categories of security.
      1. Physical security
      2. Logical security
   ii. Physical security
      1. Physical security is the protected of personal, hardware , programs that could causes serious losses or damages to an enterprises agency or institution.
   iii. Logical Security
      1. Logical security consists of software safeguards for an organizations system including user identifications and password access , authentication, access rights and authority levels.
b. Data privacy
   i. Information privacy or data privacy is the relationship between collection and dissemination of data technology, the public expectations of privacy and the legal and political issues surrounding them.

43. What are roles of database administrator?

a. Installing and upgrading the database server
b. Allocating system storage and planning future storage requirements for the database system
c. Enrolling users and maintenance system security
d. Controlling and monitoring user access to the database
e. Backup and recovery of database

44. What are the data types used in SQL, ORACLE?

	Access	SQL Server	Oracle
Text *fixed *Variable	Text	Char Varchar Nchar,nvarchar Text	CHAR VARCHAR2 NVARCHAR2 LONG
Number *integer *Float *Double *currency	integer *Float *Double *currency	integer *Float *Double *currency	INTEGER NUMBER
Data/time	Data/time	Datetime	DATE
Image	OLE object	Image	LONG RAW

45. Development issues on large objects.

a. Design is harder on large projects
    i. Communication with multiple users
    ii. Communication between IT workers
    iii. Need to divide project into pieces for teams
    iv. Finding data/components.
b. Need to monitor design process
    i. Scheduling
    ii. Evaluation
c. Build systems can be modified later
    i. Documentation
    ii. Communication

46. List out the control forms

a. Textboxes – used to display data from the database and to enter new values
b. Label – plain text that cannot be changed directly by the user
c. Command buttons – user click events
d. Check boxes and option boxes – select from a choice of options
e. Combo and list boxes – list of items from which the user can choose one value.

47. Discuss about direct manipulation of Graphical Objects.

a. The user interface to applications has been changing. The heavy use of graphics has led to an emphasis on direct manipulation of objects.
b. Instead of typing commands, the user can drag an item one location on the screen to another to indicate a change.
c. A graphical approach can make your applications easier to use.
d. With the graphical approach the users sees photos of the individual animals and drag them to the customer to indicate a sale.
e. double-clicking on an item provides more pictures
f. it limits the actions of the users to those that you have defined.

Part C(10 marks)

1. Discuss about components of DBMS.

Database engine

The database engine is the heart of the dbms. The engine is responsible for defining, storing and retrieving the data.

Data dictionary

The data dictionary holds the definition of all the tables. A data dictionary contains design information, user permissions etc..

Query processor

It is a fundamental components of DBMS. All database operations can be run through the query language

Report writer

Report is a summarization of data. It enables report on the screen

Form generator

A form generator helps to create input forms. The forms generator enables to build forms

Application generator

An application is a collection of forms and reports designed for a specific user task

Communication and integration

Database system provide special communication and integration utilities

Security and other utilities

DBMS is responsible for establishing and maintaining security access problems.

2. **Explain about Normalization**.
   a. Normalization is a process of organizing data in a database
   b. It eliminates redundant data, it was developed by E.F.codd
   c. First Normal Form(1NF) – Single value Attribute
      i. Each cell contain only one value, by default all the RDBMS satisfies 1NF.
   d. Second Normal Form(2NF) – No partial dependency
      i. To be in second normal form, a table should satisfy two conditions
         1. To satisfy 1NF
         2. No partial dependency

Partial dependency – when a non-key attribute depends partially on the key .

Third Normal Form(3NF) – No transitive dependency

i. To be in third normal form, a table should satisfy two conditions
   3. To satisfy 2NF
   4. No transitive dependency

Transitive dependency – when a non-key attribute generates a non-key generates.

Stuid	name
S1	ram
S2	seetha

Clgid	Clgname	location
C1	QMC	Medavakka,
C2	MCC	Tambaram

College name=>location (transitive dependency)

   a. Fourth Normal Form(4NF) – no multivalue dependency

b. Fifth normal form(5NF) – no join dependency

3. Explain about DDL,DML, DCL and TCL Commands.

a. SQL is a high-level language and is very flexible
b. DDL-Data Definition Language. It is used to define the tables.
c. Create,alter,drop,truncate
d. Creating a table: create table tablename(columnname datatype……..)
e. Create table student(rno number,name varchar(20))

RNO	NAME

f. Alter a table – alter command is used to modify the existing column.
g. Example : alter table student add(Gender varchar(5))

RNO	NAME	GENDER

h. Drop a table – to drop a table from database
i. Truncate- it removes all records in a table.
j. DML – DATA MANIPULATION LANGUAGE(insert, update, select, delete)
k. Insert – it is used to insert a record in a table
l. Insert into student(10,'ram','male')
m. Update – it is used to update the existing value.
n. Select – it is used to view the records.
o. Delete – it is used to delete the records (delete from student)
p. DCL – DATA CONTROL LANGUAGE(Grant, Revoke)
q. Grant – Grant permission to the user
r. Revoke – to get back the permissions provided
s. TCL – TRANSACTION CONTROL LANGUAGE
t. Commit – changes are made permanent
u. Roll back – it causes all data changes, since the last commit to the discarded
v. Save point – save the state of the database at a current point

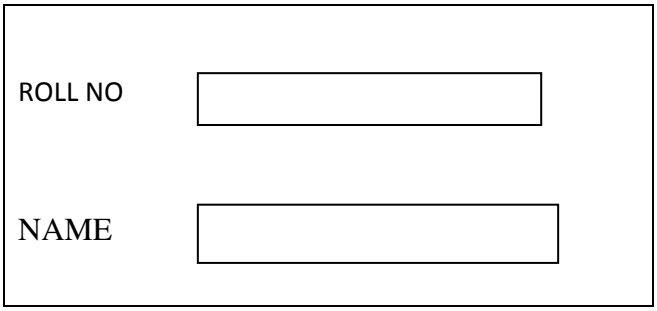
4. Discuss about forms and reports.

a. Forms are used to
   i. Collect the data
   ii. Display result of queries
   iii. Display analysis
   iv. Perform computations
b. Effective design is to determine the needs of the user
   i. User control – match user tasks
   ii. Consistency – layout, design
   iii. Clarity – organization purpose
   iv. Aesthetics – graphics , sound
   v. Feedback – changes to data completion of tasks

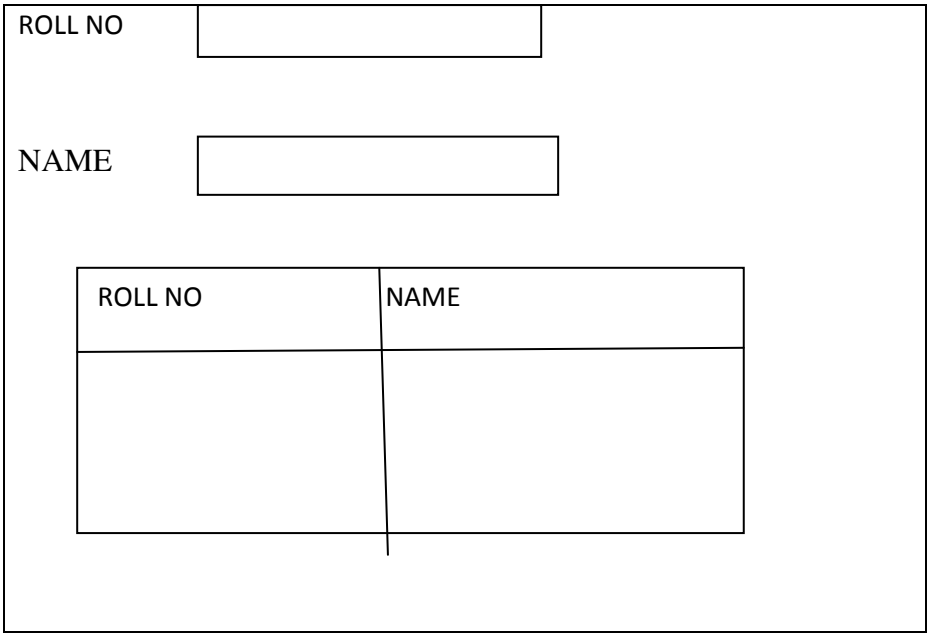
vi. Forgiveness – backup and recovery
vii. Form layout or types of form
viii. Tabular form – display data in rows and columns (eg: excel sheet)

A	B	C	D	E
1				
2				

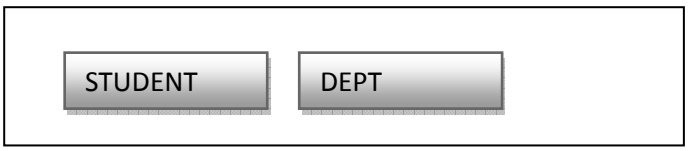
ix. Single –row or column forms
x. Show data in one row or one column at a time



xi. Sub forms – it is the one – to many relationship main form must be a single row form, sub form should be tabular view.



xii. Switchboard form – user select a button that matches his/her tasks.



xiii. Reports – report is the summarization of data (eg: weekly sales summaries)
xiv. Report design – report layout, tabular report, subgraphs report, graphs report, label report, size of the report, paper size, number of copies, availability colors,
xv. Types of report – tabular report, label reports, groups and subtotal reports, graph report
xvi. Tabular report – it is generally used for detailed items listing such as inventory reports.

A	B	C	D	E
1	AAA	BCA	2014	II year
2	BBB	BCA	2015	I year

xvii. Label report – one row of data is printed in one column on the page
xviii.

1	AAA	BCA	2014	IIyear
2	BBB	BCA	2015	I year

Groups and subtotals report:

The most common type report based on groups/subtotal reports ,most flexibility .

Example : printing a receipts or bill

Graph report:

The first step creating a graph on reports is to decide with the user what type of graph will best illustrate the data.

5. Discuss about data storage method.

g. There are three primary method of string data tables(sequential, pointers, indexes)
h. Sequential storage – sequential files are the simplest method of storing data. Each row is stored in a predefined order. Sequential access is a system by which stored data is accessed in a fixed order. Ex: audio or video cassette.
i. Advantages : sequential files are used for backup
j. Drawbacks – the database has to retrieve every row in the table hence finding an arbitrary row is much slower.
k. Pointers – the solutions to the problems of sequential tables is to use indexes. Indexes help to understand the use of pointers. When data is stored, it is stored at same location. This location can be in memory but databases are concerned with storage on

disk drives. This location is identified by some type of address. A variable that points to this address is called a pointer.

l. Drawbacks – the database is tied to a specific disk drive in physical pointers.
m. Indexes – indexed method provides fast random and sequential access to tables from any predetermines sort condition. Indexes are small enough to fit into RAM.
n. RAM access is almost a million times faster than access to data stored on a rotating disk drive. A table can have many indexes
o. Drawbacks – if the index stored sequentially there is a difficulty in inserting a new row.

6. **Describe about joins and types.**

Joins is used to retrieve data from multiple tables. The process of forming rows by matching the condition is called joining the tables. Joins is based on a primary and foreign key.

There are two types of joins

Inner joins and Outer joins (left outer joins, right outer joins, and full outer join)

Inner joins – inner join selects or retrieves only matching records from both the tables

Employee table

EMP_NAME	DEPT_ID
Nirmal	31
Jones	33
Swetha	33
Robinson	34
Sneha	34
John	null

department table

DEPT_ID	DEPT_NAME
31	Sales
33	Engineering
34	Clerical
35	marketing

example :

select *from employee innerjoin department on employee.dept_id=department.dept_id;

EMP_NAME	DEPT_ID	DEPT_NAME	DEPT_I
Nirmal	31	SALES	31
Jones	33	ENGINEERING	33
Swetha	33	ENGINEERING	33
Robinson	34	CLERICAL	34
Sneha	34	CLERICAL	34

OUTER JOIN:

Outer join retrieves matching records from both the table and also preserves unmatching records.

Left Outer join:

Matching records and preservers records from left table.

Example :

select *from employee leftouterjoin department on employee.dept_id-department.dept_id;

EMP_NAME	DEPT_ID	DEPT_NAME	DEPT_I
Nirmal	31	SALES	31
Jones	33	ENGINEERING	33
Swetha	33	ENGINEERING	33
Robinson	34	CLERICAL	34
Sneha	34	CLERICAL	34
John	Null	Null	Null

Right Outer join:

Matching records and preservers records from right table.

Example :

select *from employee rightouterjoin department on employee.dept_id=department.dept_id;

EMP_NAME	DEPT_ID	DEPT_NAME	DEPT_I
Nirmal	31	SALES	31
Jones	33	ENGINEERING	33
Swetha	33	ENGINEERING	33
Robinson	34	CLERICAL	34
Sneha	34	CLERICAL	34
Null	Null	MARKETING	35

full Outer join:

Matching records and preservers records from both sides of the table.

Example :

select *from employee fullouterjoin department on employee.dept_id=department.dept_id;

EMP_NAME	DEPT_ID	DEPT_NAME	DEPT_I
Nirmal	31	SALES	31
Jones	33	ENGINEERING	33
Swetha	33	ENGINEERING	33
Robinson	34	CLERICAL	34
Sneha	34	CLERICAL	34
John	Null	Null	Null
Null	Null	Marketing	35

7. **Discuss about table operation.**

Storing and retrieving data from each table in DBMS is known as table operations. There are three major categories of operations that affect tables are,

Retrieving data , storing data, reorganizing the database

Retrieve data:

The three types of data retrieval are:

Read entire table , read next row/sequential , read arbitrary / random row.

READ ENTIRE TABLE:

Reading the entire table or large portions of it occur relatively when printing reports.

Example : to print weekly pay checks, the application will have to read every row in the employee table.

READ NEXT ROW/SEQUENTIAL

Reading the next row in a sequence is related to retrieving all the data in a table. It is generally retrieved in some order or sequence.

Example : paychecks might be printed in alphabetical order by employee name, department name or postal code.

READ ARBITRARY/ RANDOM ROW

Retrieving any arbitrary row is some times called random access because the database does not know which record might be requested.

Example : any customer could place on order at random and the data would have to retrieve the matching data for that customer.

STORE DATA:

DBMS has to perform three basic operations involved with storing data

Inserting a row, deleting a row, modifying a row.