SQL Solutions:

1)A, D

2)A, B, C

3)B

4)B

5)A

6)C

7)B

8)B

9)B (Alter Table A modify Column D int)

10)A

11) A Data Warehousing (DW) is process for collecting and managing data from varied sources to provide meaningful business insights. A Data warehouse is typically used to connect and analyze business data from heterogeneous/different sources. The data warehouse is the core of the BI system which is built for data analysis and reporting.

It is a blend of technologies and components which aids the strategic use of data. It is electronic storage of a large amount of information by a business which is designed for query and analysis instead of transaction processing. It is a process of transforming data into information and making it available to users in a timely manner to make a difference.

12) Key Differences Between OLTP and OLAP are as below:

- OLTP is an online transaction system whereas, OLAP is an online data retrieval and analysis system.
- Online transactional data becomes the source of data for OLTP. However, the different OLTPs database becomes the source of data for OLAP.
- OLTP's main operations are insert, update and delete whereas, OLAP's main operation is to extract multidimensional data for analysis.
- OLTP has short but frequent transactions whereas, OLAP has long and less frequent transaction.
- Processing time for the OLAP's transaction is more as compared to OLTP.
- OLAPs queries are more complex with respect OLTPs.
- The tables in OLTP database must be normalized (3NF) whereas, the tables in OLAP database may not be normalized.

- As OLTPs frequently executes transactions in database, in case any transaction fails in middle it may harm data's integrity and hence it must take care of data integrity. While in OLAP the transaction is less frequent hence, it does not bother much about data integrity.

13) Various characteristics of data-warehouse are as follows:

Subject Oriented:

A data warehouse is subject oriented because it provides information around a subject rather than the organization's ongoing operations. A data warehouse does not focus on the ongoing operations, rather it focuses on modelling and analysis of data for decision making.

Integrated:

A data warehouse is constructed by integrating data from heterogeneous sources such as relational databases, flat files, etc.This integration enhances the effective analysis of data.

Time Variant:

The data collected in a data warehouse is identified with a particular time period. The data in a data warehouse provides information from the historical point of view.

Non-volatile:

Non-volatile means the previous data is not erased when new data is added to it.

Some data is denormalized for simplification and to improve performance.

Queries often retrieve large amounts of data.

Both planned and ad hoc queries are common.

The data load is controlled.

14)A star schema is the elementary form of a dimensional model, in which data are organized into facts and dimensions. A fact is an event that is counted or measured, such as a sale or log in. A dimension includes reference data about the fact, such as date, item, or customer.

A star schema is a relational schema where a relational schema whose design represents a multidimensional data model. The star schema is the explicit data warehouse schema. It is known as star schema because the entity-relationship diagram of this schemas simulates a star, with points, diverge from a central table. The center of the schema consists of a large fact table, and the points of the star are the dimension tables.

Fact Tables:

A table in a star schema which contains facts and connected to dimensions. A fact table has two types of columns: those that include fact and those that are foreign keys to the dimension table. The primary key of the fact tables is generally a composite key that is made up of all of its foreign keys.

A fact table might involve either detail level fact or fact that have been aggregated (fact tables that include aggregated fact are often instead called summary tables). A fact table generally contains facts with the same level of aggregation.

Dimension Tables:

A dimension is an architecture usually composed of one or more hierarchies that categorize data. If a dimension has not got hierarchies and levels, it is called a flat dimension or list. The primary keys of each of the dimensions table are part of the composite primary keys of the fact table. Dimensional attributes help to define the dimensional value. They are generally descriptive, textual values. Dimensional tables are usually small in size than fact table.

Characteristics of Star Schema:

- The star schema is intensely suitable for data warehouse database design because of the following features:
- It creates a DE-normalized database that can quickly provide query responses.
- It provides a flexible design that can be changed easily or added to throughout the development cycle, and as the database grows.
- It provides a parallel in design to how end-users typically think of and use the data.
- It reduces the complexity of metadata for both developers and end-users.

Advantages of Star Schema:

Star Schemas are easy for end-users and application to understand and navigate. With a well-designed schema, the customer can instantly analyze large, multidimensional data sets.

Query Performance:

A star schema database has a limited number of table and clear join paths, the query run faster than they do against OLTP systems. Small single-table queries, frequently of a dimension table, are almost instantaneous. Large join queries that contain multiple tables takes only seconds or minutes to run.

In a star schema database design, the dimension is connected only through the central fact table. When the two-dimension table is used in a query, only one join path, intersecting the fact tables, exist between those two tables. This design feature enforces authentic and consistent query results.

Load performance and administration:

Structural simplicity also decreases the time required to load large batches of record into a star schema database. By describing facts and dimensions and separating them into the various table, the impact of a load structure is reduced. Dimension table can be populated once and occasionally refreshed. We can add new facts regularly and selectively by appending records to a fact table.

Built-in referential integrity:

A star schema has referential integrity built-in when information is loaded. Referential integrity is enforced because each data in dimensional tables has a unique primary key, and all keys in the fact table are legitimate foreign keys drawn from the dimension table. A record in the fact table which is not related correctly to a dimension cannot be given the correct key value to be retrieved.

Easily Understood:

A star schema is simple to understand and navigate, with dimensions joined only through the fact table. These joins are more significant to the end-user because they represent the fundamental relationship between parts of the underlying business. Customer can also browse dimension table attributes before constructing a query.

Disadvantage of Star Schema

There is some condition which cannot be meet by star schemas like the relationship between the user, and bank account cannot describe as star schema as the relationship between them is many to many.

We can create even more complex star schemas by normalizing a dimension table into several tables. The normalized dimension table is called a Snowflake.

15)The SET command is used with UPDATE to specify which columns and values that should be updated in a table.

The WHERE clause specifies which record(s) that should be updated. If you omit the WHERE clause, all records in the table will be updated with new value.