Question 1:

Answer:

- **DBMS**: A software used to manipulate data stored in a computerized database. It has internal programs that manipulate the databases. Ex : SQLite, MySQL.
- **Database System:** All the data and their relations are stored in the form of tables here.
- **Meta-Data:** It contains the information of data that manages the database. Ex: Data-types(int, varchar), information and relationships about the tables.
- **Transaction-processing Application:** Transaction processing makes sure that a data is either added or deleted to a database. No intermediate operations are entertained. This shows that data integrity is maintained. Finally, transaction processing in application see that ACID properties are followed well by the application.

Question 2:

Answer:

- DBMS can Manipulate a database which means it can perform operations such as retrieving, insertion, deleting, updating of data. Additionally DBMS can access database through web applications.
- **Data Recovery**: DBMS provide recovery of lost data without complex operations.
- **Security:** DBMS decides which user has authority over the data. Where admin can add, modify, delete records to Database, but end-user has access to their corresponding data only. This helps maintain privacy.

Question 3:

Answer:

Naïve End User: The user do not have any idea of Database Systems. User mainly perform query operations to get information and update data in the database. Ex: person at help desk telling the price of an item at Walmart.

Sophisticated End User: Business Analysts, Scientists who has a basic knowledge of managing data on systems act as users. These users learn the working of database systems to an extent where their requirements can be performed.

Stand-alone End User: The user is provided with non-technical user friendly graphical interface where the user can manage data by implementing simple operations such as click, drag-drop.

Question 4:
Answer:

Data Dictionary: Data dictionary is also called meta-data. As the standard dictionary contain definition/meaning of words, DBMS dictionary stores the metadata separately and these can be used by different database systems.
Multi View: Multiple users can access the data with integrity. Multiple interfaces are displayed based on the

Question 5:
Answer:
The application that require database is simple.
When application specification cannot be addressed by database.
When the cost to build a database is high.
Maintaining security, recovery and internal functionality is complex.

Question 6:
Answer:

- **Columns affected are:** Majors,Course_number, Department, Prerequisite_number
- Related records are written in the table.

Course	Section
Course	Prerequisite
Section	Grade_Report

Relation_name	No_of_columns
STUDENT	4
COURSE	4
SECTION	5
GRADE_REPORT	3
PREREQUISITE	2

Column_name(record)	Data_type	Belogs_to_relation
Name	Char	STUDENT
Student_number	Int	STUDENT
Class	Int	STUDENT
Major	Char	STUDENT
Course_name	Char	COURSE
Course_number	Varchar	COURSE
Credit_hours	Int	COURSE
Department	Char	COURSE
Section_identifier	Int	SECTION
Semester	Char	SECTION
Year	Int	SECTION
Instructor	Char	SECTION
Grade	Char	GRADE_REPORT
Prerequisite_number	Varchar	PREREQUISITE

- Courses and grade of Brown.
    - Student --> Grade_Report(student_number and Section_identifier,Grade) - 4 records.
    - Grade_Report -> Section(Section_identifier and Course_number) - 4 records.
    - Section -> Course (course_name and course_number) - 4 records.

Student_number	Section_identifier	Course_number	course_name	Grade
8	85	MATH2410	Discrete Math	A
8	92	CS1310	Into to CS	A
8	102	CS3320	Data S	B
8	135	CS3380	Database	A