1. What is the relationship between

An entity and a record:

A *record* is defined as a set of demographic information that represents one individual (e.g., a person) or object (e.g., car, machine part, or organization). A record object is a representation of what a single source system asserts to be true about an individual or thing. An entity can potentially have multiple records across multiple source systems. Thus, an entity is the logical relationship between two or more records.

An attribute and a field:

A field is the intersection of an attribute and a record. A database table will have multiple attributes, such as name, address, phone, etc. Each record in the table has the data on one item, such as a customer. The name of a specific customer will be stored in the field that is the intersection of the name attribute and the record for that specific customer.

An entity set and a file:

It is a set of entities of the same entity type. So, a set of one or more entities of Student Entity type is an Entity Set. A file is used to represent an association between entity sets.

2. What is sequential access? What is direct access? Which of the two is more important in today's business environment? Why?

Sequential access is the retrieval of records one after another either in physical sequence based on their position on disk or in the logical sequence based on field values.

Direct access is the retrieval of one record or a subset of the records of a file based on field values.

Direct access is more important in today's business environment because of all of the real-time applications that depend on being able to retrieve specific records as needed.

3. What are the two kinds of data redundancy, and what are the three types of problems that they cause in the information system environment?

The two kinds of data redundancy are:

(a) Redundancy within a single file: same data will be repeated in a same file.

(b) Redundancy among different files: data will be found in different files in a database.

The three types of problems caused because of data redundancy in an information system are:

i. Storage space wasted as multiple copies of same file are stored.

ii. Data integrity problem can be caused as multiple copies of same data are stored.

iii. When redundant data is to be updated, it has to be updated at every occurrence of the redundant data. So, wastage of time.

4. What expectation should there be for a database management system with regard to handling multiple relationships? Why?

There should be following expectations:

i. Data integration should not be compromised.

ii. It should be able to store data about the entities by preserving the relationship between them.

iii. It should be able to handle any type of information without introducing redundant data. If redundant data is introduced, it will lead to inconsistency in data.

5. What expectation should there be for a database management system with regard to handling data control issues such as data security, backup and recovery, and concurrency control? Why?

For a database management system about handling data control issues such as data security, backup and recovery, and concurrency control, there should be following expectations:

i. Data in the database must be secured from improper or unauthorized access to data, unauthorized updates of data, loss of data etc. So, it should be able to take care of security of data stored.

ii. Data must be protected from natural disasters for which backups needs to be created to recover data in case of losses.

iii. It should be able to handle concurrency control problems.

6. What expectation should there be for a database management system with regard to independence? Why?

A database management system should be as data independent as possible to allow for the modifications of data structures as corporate changes require them, without the need for changing the programs that depend on the data in the structures. So, if DBMS is data independent then there is no need to change programs every time a modification is done to the data structures used to store the data in the database.

7. Consider a hospital in which each doctor is responsible for many patients while each patient is cared for by just one doctor. Each doctor has a unique employee number, name, telephone number, and office number. Each patient has a unique patient number, name, home address, and home telephone number.

a. What kind of relationship is there between doctors and patients?

   The relationship between the doctors and patients is one-to-many relationship. Because one doctor can see many patients, but patient is cared by one doctor only.

b. Develop sample doctor and patient data and construct two files in the style of Figure 3.5 in which to store your sample data.

Doctor			
Employee Id	Name	Phone Number	Specialization
123456	XYZ	534-5343-3474	Cardiologist

Patient			
Patient Number	Name	Address	Phone Number
456789	ABC	MN Street	646-4444-3232

c. **Do any fields have to be added to one or the other of the two files to record the relationship between doctors and patients? Explain.**

We can add the doctor specialization and experience fields to the doctor file and the patient disease to the patient file. Because of this fields anyone can easily know that to which disease the doctor will treat, and which patient consults which doctor. We can also put relationship between the doctor specialization and the patient disease. With this relationship we can pull the data about the doctor and his patients and patients with their doctors' information.

d. **Merge these two files into one, in the style of Figure 3.6. Does this create any problems with the data? Explain.**

Information Sheet							
Employee Id	Name	Phone Number	Specialization	Patient Number	Name	Address	Phone Number
123456	XYZ	534-5343-3474	Cardiologist	456789	ABC	MN Street	646-4444-3232

This will create many problems because there is no consistency in this data, there is no clarity, and will arise data integrity problems. It is always preferable to maintain the two files separately and to connect them using the relationship then only it will work properly. In the above file we merged two tables because of this data will not be stored exactly. Inaccurate data will be stored, and it will be difficult to understand and interpret the data stored.