Short Answer Questions

Answer the following questions with complete sentences in your own words. You are encouraged to conduct your own research online or through other methods before answering the questions. If you research online, please consult multiple sources before you write down your answers. You are expected to be able to explain your answers in detail (Provide examples to each question).

1. What is data modeling? Why do we need it? When would you need it?
2. What is an entity? What is an attribute? What is a tuple? What is a domain?
3. What is a superkey? Give an example of a superkey that is not a candidate key and explain why.
4. What is the primary key? How is it different from a unique key?
5. What are relationships in data modeling?
6. What is cardinality in data modeling? What are different types of cardinalities? Give an example for each type.
7. What is composite attribute, multi-valued attribute, and derived attribute? Give at least one example for each type of attribute that is not in the course material.
8. How do you represent a many-to-many relationship in a database? Please describe in detail using an example.
9. What is normalization and why is it needed?
10. What does data redundancy mean? Give an example of data redundancy.
11. What are the different types of dependencies? How are they different? Give an example of each type.
12. What are normal forms? Which normal forms are most common?
13. What is database integrity? Why do you need it? Provide an example of user-defined integrity.
14. What is DDL? What are the major statements in DDL?
15. What is DML? What are the major statements in DML?
16. How do you insert values into a table if you don't know the order of the columns?
17. How is truncate different from delete?
18. Is syntax in SQL case sensitive?
19. What are constraints? Why do we need them? Are they mandatory to have?
20. How do you make sure there are no duplicate values in a column?
21. How many ways can you add constraints to a table? How are they different?

Coding Questions

1. Please show the tables in their 1NF, 2NF, and 3NF. Your answer should be shown in table format as well. No need to code this. (Hint: adding key columns such as "owner_id" might be helpful with the normalization.)

PET ID	PET NAME	PET TYPE	PET AGE	OWNER	VISIT DATE	PROCEDURE
246	ROVER	DOG	12	SAM COOK	JAN 13/2002	01 – RABIES VACCINATION
					MAR 27/2002	10 – EXAMINE and TREAT WOUND
					APR 02/2002	05 – HEART WORM TEST
298	SPOT	DOG	2	TERRY KIM	JAN 21/2002	08 – TETANUS VACCINATION
					MAR 10/2002	05 – HEART WORM TEST
341	MORRIS	CAT	4	SAM COOK	JAN 23/2001	01 – RABIES VACCINATION
					JAN 13/2002	01 – RABIES VACCINATION
519	TWEEDY	BIRD	2	TERRY KIM	APR 30/2002	20 – ANNUAL CHECK UP
					APR 30/2002	12 – EYE WASH

2. We would like to design a database to maintain information about hospital staff, including doctors and nurses, and patients at the hospital. The information we need includes:
   a. Staff, including their names, addresses and social-security numbers.
   b. Patients, including their names, addresses, and the name of their insurance company.
   c. Patients are each assigned to a ward (room).
   d. The staff that are nurses are assigned to zero or more wards. Each ward has at least one nurse assigned.
   e. The staff that are doctors are assigned to zero or more patients. Patients may or may not have a doctor assigned, and they may have more than one doctor.
   f. Patients in the same ward may have different doctors but will always have the same nurse(s).

   Please design the ERD.

3. Read the README file from adventureworks. And create the database in MySQL workbench.
    a. Return all columns and data regarding employees only
    b. Return all the names of customers in adventureworks (all 3 columns)
    c. List all customers whose first name is Eugene

4. According to your answer from question 1, create tables. Populate at least three tables with data. Make sure to use different methods to populate tables. Write a query to delete all Owners whose first name is 'Sam'.

* Please submit all your SQL files including those used for inserting data.