Assignment 4 part 2

Q2. Draw an ER diagram for this scenario. You are allowed to take assumptions if needed. State clearly any assumptions you make.

A company has a number of employees. The attributes of EMPLOYEE include Emp_ID (identifier), Name, Address, and Birthdate. The company also has several projects. Attributes of PROJECT include Proj_ID (identifier), Proj_Name, and Start_Date. Each employee may be assigned to one or more projects, or may not be assigned to any project. A project must have at least one employee assigned to it, and may have any number of employees assigner to it. An employee's billing rate may vary by project, and the company wishes to record the applicable billing rate (Billing_Rate) for each employee when assigned to a particular project.

Q3. Draw an ER diagram for this scenario. You are allowed to take assumptions if needed. State clearly any assumptions you make.

Companies, identified by Company ID and described by Company Name and Industry Type, hire consultants, identified by Consultant ID and described by Consultant Name and Consultant Specialty. Consultant Specialty is a multivalued attribute. Assume that a consultant can work for only one company at a time, and sometimes they take breaks and are not working for any company. Company can also have multiple consultants working for them, or at times, they have no need of consultants. Draw an ERD for this situation, including the entities, relationships, and proper names for the attributes, primary keys, as well as the names for the relationships.

Now, consider that each time a consultant works for a company, a contract is written describing the terms for this consultant engagement. Contract is identified by a composite identifier of Company ID, Consultant ID, and Contract Date. The contract should also include the hourly rate at which the consultant is paid. Assuming the consultant can still work for only one company at a time, redraw the ERD for this situation.

Q4. Draw an ER diagram for this scenario. You are allowed to take assumptions if needed. State clearly any assumptions you make.

A hospital has a large number of registered physicians. Attributes of physicians include an id number and specialty. Patients are admitted to the hospital by physicians. Attributes of patients include a patient id and name. Any patient who is admitted must have exactly one admitting physician. A physician may optionally admit any number of patients. Once admitted, a given patient must be treated by at least one physician. A particular physician may treat any number of patients, or may not treat any patients. Whenever a patient is treated by a physician, the hospital wishes to record the details of the treatment which include the date, time, and results.

Q5. Draw an ER diagram for this scenario. You are allowed to take assumptions if needed. State clearly any assumptions you make.

Stillwater Antiques buys and sells one-of-a-kind antiques of all kinds (e.g., furniture, jewelry, china, and clothing). Each item is uniquely identified by an item number and is also characterized by a description, asking price, condition, and open-ended comments. Stillwater works with many different individuals, called clients, who sell items to and buy items from the store. Some clients only sell items to Stillwater, some only buy items, and some others both sell and buy. A client is identified by a client number and is also described by a client name and client address. When Stillwater sells an item in stock to a client, the owners want to record the commission paid, the actual selling price, sales tax (tax of zero indicates a tax-

exempt sale), and date sold. When Stillwater buys an item from a client, the owners want to record the purchase cost, date purchased, and condition at time of purchase.

Q6. The entity type STUDENT has the following attributes:

Student Name, Address, Phone, Age, Activity, and No of Years. Activity represents some campus-based student activity, and No of Years represents the number of years the student has engaged in this activity. A given student may engage in more than one activity. Draw an ERD for this situation. What attribute or attributes did you designate as the identifier for the STUDENT entity? Why?

Q7. Are associative entities also weak entities? Why or why not? If yes, is there anything special about their "weakness"?

Q8. Consider the following database schema and functional dependencies:

R(StaffID, StaffName, CustomerID, Cust_Name, Cust_Address, Cust_Phone, OrderID, OrderDate, FoodDishId, FoodDishName, UnitPrice, Quantity, QuantityPrice)

StaffID→ StaffName

CustomerID→ Cust_Name, Cust_Address

Cust_Address→ Cust_Phone

OrderID→ OrderDate, CustomerID, StaffID

FoodDishID→ FoodDishName, UnitPrice

OrderID, FoodDishID→ Quantity, QuantityPrice

a) **Identify the current Normal form and justify Your answer with valid reason.**
b) **Normalize the relation till BCNF.**

Q9. Consider the relation R(ABCDEFGH)

The FDs are F={AB→C, AC→B, AD→E, B→D, BC→ A, E→ G}

Find all the candidate keys of R. Show all steps.