Question # 1:   **/10**

Select the correct answer for each of the following questions. Circle the correct option.

1. Consider the following statement: "An employee can be a manager, a technician, or neither." Which of the following rules does this scenario represent?

A. Overlap Rule and Partial Specialization
B. Disjoint Rule and Total Specialization
C. Overlap Rule and Total Specialization
D. Disjoint Rule and Partial Specialization

2. What is the role of an associative (or junction) entity in an ERD?

A. To act as a weak entity for other strong entities.
B. To resolve many-to-many relationships between two entities.
C. To store attributes of a single entity.
 D. To enforce disjoint rules between entities

3. What is the main purpose of using "specialization" in an Enhanced ERD?

A. To create a new database schema.
B. To create subtypes from a supertype based on specific attributes.
C. To enforce relationships between weak and strong entities.
D. To simplify the ER diagram by removing redundant relationships.

4. What is the degree of a relationship?

A. The number of attributes in an entity
B. The number of entities participating in a relationship
C. The cardinality constraints in a relationship
D. The type of attributes involved in a relationship

5. If an EER diagram becomes too cluttered, what strategy can you apply to improve its readability?

A. Use additional supertypes and subtypes.
B. Add more attributes to the supertype.
C. Create entity clusters to group related entities and relationships.
D. Use overlapping subtype discriminators.

Create an ERD/EERD for the following scenarios. Clearly label entities, attributes, primary keys, and relationships. Ensure cardinalities are represented accurately.

Question # 2:

Company organized into DEPARTMENT. Each department has a unique name and a particular employee who manages the department. Start date for the manager is recorded. Department may have several locations.

A department controls a number of PROJECT. Projects have a unique name, number and a single location.

Company's EMPLOYEE name, employee no, address, salary, sex and birth date are recorded. An employee is assigned to one department, but may work for several projects (not necessarily controlled by his/her department).

Employee's DEPENDENT are tracked for health insurance purposes (dependent name, birthdate, relationship to employee).

Question # 3:   **/10**

A hospital consists of various WARDs, each identified by a unique code. Each ward has a type (e.g., General, ICU, Pediatrics) and a capacity.

PATIENTs are admitted to the hospital. Each patient is identified by a patient ID, has a name, address, and birth date. Patients are assigned to a specific ward during their stay, and the admission date is recorded.

The hospital employs DOCTORs, each with a unique doctor ID, name, specialization, and contact information. Each doctor may be assigned to one or more wards, and they can treat multiple patients.

MEDICAL STAFF members, including nurses and administrative staff, are also part of the hospital. Each staff member has a staff ID, name, role, and contact information. Nurses are assigned to specific wards, and administrative staff may work in different departments.

The hospital manages information about DRUGs in its pharmacy. Each drug has a unique code, a name, and a description. The system keeps track of the quantity of each drug in stock.

PATIENTs may be prescribed MEDICATION during their stay. Each prescription is identified by a prescription ID, and it includes details such as the drug name, dosage, and frequency. The system records when the prescription was given

to the patient.

Question # 4:   **/10**

A person may be employed by one or more organizations, and each organization may be the employer of one or more persons. An organization can be an internal organizational unit or an external organization. For persons and organizations, we want to know their ID, name, address, and phone number. For persons, we want to know their birth date, and for organizations, we want to know their budget number. For each employment, we want to know the employment date, termination date, and bonus. Employment of a person by an organization may result in the person holding many positions over time. For each position, we want to know its title, and each time someone holds that position, we need to know the start date and termination date and salary. An organization is responsible for each position. It is possible for a person to be employed by one organization and hold a position for which another organization is responsible.