Problem 2.1.1  (7 points)

Key:

- Many-Many Relationship
- Many-One Relationship
- One-Many Relationship
- One-One Relationship
- Referential Integrity

Note: Below is just ONE right answer. There are many possible correct responses. If your response is different, that does not necessarily mean that your solution is incorrect.

Problem 2.1.2  (16 points)

Part a)  (3 points)
Part d) (5 points)

Customers
- Name
- SSN
- Type
- Number
- Accounts
- Balance
- Own
- Lives at
- Street
- City
- State
- Own

Problem 2.1.3 (10 points)

Teams
- Name
- Team Cap.
- Rep. By
- Is Made Up Of
- Colors
- Favorite
- Fans
- Wear
- Normal
- Color
- Wear
- Favorite
- Players
- SSN
- Name
Problem 2.1.4 (15 points)

Part a) (5 points)

Only relevant part shown (Involves only Teams, Players, and their relations):

Part b) (5 points)

Only relevant part shown (Involves only Teams, Players, and their relations):

Part c) (5 points)

The relationships end up being the same. When the tertiary relation was split, a new entity set was formed. This is just redundant information, as leaders clearly overlap with Players. Nevertheless, both models convey the same information.
Problem 2.1.6  (10 points)

Problem 2.2.1  (8 points)

The following are just a few examples – your answer may have additional responses as well.

1) **Violation:** Redundancy  
   **Reason:** Addresses is storing address as an attribute but AcctSets stores the same address.  
   **Modification:** Make address as an attribute to Customers.

2) **Violation:** Simplicity  
   **Reason:** AcctSets serves no purpose (or it serves the same purpose has Addresses).  
   **Modification:** Delete AcctSets and directly connect Accounts to Customers with the “Member of” relation.

Problem 2.2.5  (15 points)

Part a)  (5 points)
Part b) (5 points)

Part c) (5 points)

Problem 2.3.1 (15 points)

Part a) (5 points)
**Keys** (shown in underlines)
- Customers: SSN
- Accounts: Number

**Referential Integrity Constraints** (shown with rounded arrows)
- None
- You can have some so long as you state your assumption (i.e. Customer must exist for an account to be valid)

**Part b**

(5 points)
Part c) (5 points)

Referential Integrity Constraints (shown with rounded arrows)
- Mother must exist for a child
- Father must exist for a child

Problem 2.4.1 (10 points)

Weak Entity Sets (shown in double boxes)
- Enrollment - only attribute cannot uniquely define it

Keys (shown in underlines)
- Courses: Number and Dept.
- Students: Student ID
- Enrollment: Student ID, Dept., and Course Number
  - Grade is NOT part of the key
Problem 2.4.2  (10 points)

Keys (shown in underlines)
- Courses: Dept. and Number
- Students: Student ID
- Assignments: Assignment Number, Dept., and Course Number
- Enrollment: Student ID, Assignment Number, Dept., and Course Number

Weak Entity Sets (shown in double boxes)
- Assignments
- Enrollment

Problem 2.4.4a  (5 points)