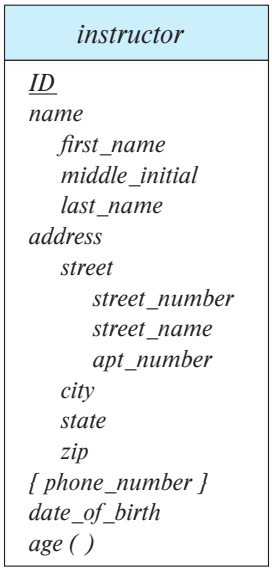

Figure 6.8 E-R diagram with composite, multivalued, and derived attributes.

it is (missing), or that we do not know whether or not an apartment number is part of the instructor's address (unknown).

6.4 Mapping Cardinalities

Mapping cardinalities, or cardinality ratios, express the number of entities to which another entity can be associated via a relationship set. Mapping cardinalities are most useful in describing binary relationship sets, although they can contribute to the description of relationship sets that involve more than two entity sets.

For a binary relationship set R between entity sets A and B, the mapping cardinality must be one of the following:

- **One-to-one**. An entity in A is associated with *at most* one entity in B, and an entity in B is associated with *at most* one entity in A. (See Figure 6.9a.)
- **One-to-many**. An entity in A is associated with any number (zero or more) of entities in B. An entity in B, however, can be associated with *at most* one entity in A. (See Figure 6.9b.)
- **Many-to-one**. An entity in A is associated with *at most* one entity in B. An entity in B, however, can be associated with any number (zero or more) of entities in A. (See Figure 6.10a.)