SQL-syntax diagram is attached.

Tasks 1 and 2 are based on the following tables of a cabin rental system.

customer(customerNumber, name, address, locality, phone, email) [1000 rows]
cabin(cabinId, areacode->area, classification, address, locality, number_of_rooms, driving_instructions) [300 rows]
equipped(cabinId->cabin, equipmentId->equipment, description, image) [1500 rows]
weekly_fee(cabinId->cabin, year, week, fee) [90000 rows]
area(areacode, description) [50 rows]
equipment(equipmentId, name) [20 rows]
reservation(rId, customerNumber->customer, date_made) [12000 rows]
reservation_contents(rId->reservation, (cabinId, year, week)->weekly_fee) [15000 rows]

1. 
   a) Tables cabin and equipped are joined using the join condition cabin.cabinId=equipped.cabinId. How many rows does the result have?
   b) How many rows there are in the result of the selection σ_{cabinId\neq125} (cabin)?
   c) Is the natural join of tables cabin and weekly_fee possible and, if it is, what is the join condition?
   d) Which projection result has more rows π_{cabinId, description} (equipped) or π_{cabinId,equipmentId} (equipped)? Justify your answer briefly.
   e) A new table class(classId, description) has been considered to explain the classification of the cabins. What referential connections would the inclusion of this table cause.
   f) If the reservation 1234 is deleted from table reservation, what changes should be done to the other tables in order to preserve the referential integrity. (12p)

2. Based on the tables of the cabin rental database give the following queries in SQL.
   a) List the cabins (cabinId, locality, and address) that are reserved for the week 10 in 2010.
   b) List the areas that do not have any reservations for the week 10 of year 2010.
   c) Prepare a report that shows the total fees that according to reservations should have been paid in year 2009 for each cabin located in Heinola.
   d) List the cabins with poor equipment standard (less than 3 equipments) (12p).

Turn the paper for tasks 3 and 4.
3. The following conceptual model represents the data in a simple access control system. In order to pass a port a person must present her key card for control. Each trial to pass a port is registered as a control record that contains the time of the trial, and whether the access was allowed or denied.

Which of the following claims comply with the model?
   a) A person may have many permissions.
   b) Making of a control record presupposes that the key card can be recognized.
   c) A separate permission is required for each gate.
   d) Only one gate may be active at the same time allowing only one simultaneous access in the whole company.

   e) Give the relational schema for the access control database (use the technique of task 1 in presenting the schema). (4+6p)

4. A video rental service has designed the following table to run their business:
   copy (copy_id, movie_id, movie_name, director, yearMade, medium, dateRented, whoRentedID, whoRentedName, chargeForDay)

   If the copy is not rented whoRentedID and whoRentedName columns are null.
   a) What does the functional dependency director \( \Rightarrow \) movie_name mean in practice?
   b) How would you express the rule ”There is only one movie made in a year for each director”? 
   c) Let there be the following dependencies:
      a. copy_id \( \rightarrow \) movie_id,
      b. copy_id \( \rightarrow \) medium,
      c. copy_id \( \rightarrow \) chargeForDay,
      d. movie_id \( \rightarrow \) movie_name,
      e. movie_id \( \rightarrow \) director,
      f. movie_id \( \rightarrow \) yearMade,
      g. whoRentedID \( \rightarrow \) whoRentedName,
      h. copy_id, dateRented \( \rightarrow \) whoRentedID

   Is this relation in Boyce-Codd normal form? Justify your answer briefly. (9p)

Turn the paper for tasks 1 and 2.