

### Question 1 [10%]

- (i) What does the acronym RDBMS stand for? Give an example of such a system. (2%)
- (ii) Explain briefly the role of an RDBMS for a typical e-commerce website. (2%)
- (iii) Give a suitable schema for the database whose design is represented by the following ER diagram. Indicate clearly the keys in each case. (4%)
- (iv) Explain the term *update anomaly* and explain why such anomalies are generally deemed to be undesirable in the context of database design. (2%)

### Question 2 [36 %]

Consider a simple one-table database intended to house meteorological data for a fixed set of weather stations. Each day the following data is recorded for each station: maximum temperature, minimum temperature and rainfall. The schema is as follows.

`weatherstats(station, date, max_temp, min_temp, rainfall)`

Write a complete SQL statement for each of the following tasks.

- (i) Create the table described above. Make sure that you specify an appropriate type for each attribute and an appropriate key. (6%)
- (ii) Add rows containing the following values into the table:

station	date	max	min	rainfall
Belmullet	25/12/2012	12.0°C	4.5°C	0.0mm
Valentia	1/1/2013	8.0°C	-2.0°C	5.0mm
Gurteen	14/2/2013	6.0°C	0.0°C	4.0mm

(6%)
- (iii) Remove from the table all rows pertaining to the station with the name "Valentia". (6%)
- (iv) Increase the rainfall values for all stations for the month of February 2013 by 10%. (6%)
- (v) List all occurrences of temperatures in excess of 25°C (list the name of the station concerned, the date and the temperature). (6%)
- (vi) List all the weather stations by name and total rainfall for each in 2012. (6%)

### Question 3 [54 %] Consider the following schema for a simple hotel-reservation database.

`hotels(hotel_num, hotel_name, city)`  
`rooms(room_num, hotel_num, room_type, price)`  
`bookings(hotel_num, guest_num, arr_date, dep_date, room_num)`  
`guests(guest_num, guest_name, guest_address)`

Give complete SQL queries for each of the following.

- (i) List the details of all hotel rooms in Galway (hotel number, room number and price), priced lower than €100. (6%)
- (ii) List the names and locations of all hotels in the database and the total number of rooms for each. (6%)