The Copperbelt University

School Of Mathematics and Natural Sciences

Computer Science Department

CS235 Test 2

Q 1   Briefly discuss the following steps of transforming the ERD into relational schemas
[6 marks]

i)   Map binary relationships   ii)   Map associative entities

iii)   Map unary relationships

Q2   When is a relation said to be in the following normal forms. **[8 marks]**

a) 1st normal form, b) 2nd Normal form c) 3rd Normal form, d) Boyce code Normal form

Q 3   The Functional Dependencies below are identified between various attributes of Parts in a company warehouse:

FD1:   Part No -------> Part Description

FD2:   Pack Size, Part No --------> Price

FD3:   Pack Size, Part No --------> Floor No

FD4:   Floor No ---------> Storage Location

Produce the Relational Schema in the Second Normal Form and then in the Third Normal Form and Boyce Codd normal forms. **[6 marks]**

Q 4   The questions below relates to the two relations shown.

Students

StNo	Name	Address	City	DOB	Employer	Fees
001	Z. Able	1 Old Rd	Antrim	01-01-90	01	50,000
002	Y. Baker	2 New Rd	Bath	02-02-90	02	10,000
003	X. Close	3 Park Way	Coventry	03-03-90	03	10,000
004	W. Down	4 Ivy Ave	Derby	04-04-90	04	20,000
005	C.	5.Tak	Bath	06-07-90	02	30,000

006	Bush D. Gery	Av 6. He Ave	Glasgow	08-08-90	02		40, 000

Employees

Number	Name	Address	City	Contact	Phone
01	Rock	1 Disk Drive	Antrim	Hannah	123456
02	Smith	2 Data Link	Bangor	Irene	654321
03	Tanner	3 New Way	Derby	Joan	456123

a)   Write equivalent relational algebra statements for the following queries **[6 marks]**

   i)   Find the number of students related to employee Number 02.

   ii)   Find the cities that are found in both the students and the employers tables

   iii)   Find the number of students in each city and their total fees

   iv)   Find the cities that are found in the students table but not in the employers table

b)   Write equivalent SQL statements for the following queries **[6 marks]**

   i)   List the student's numbers, the student's names and student's addresses who are dependent on the employee whose name is Smith, the output should be in alphabetical order of city and within city in alphabetical order of name.

   ii)   Find the total fees for students in cities that have more than one student

   iii)   Find the Employers name, address of employers and the number of students sponsored by each employee.

   iv)   Find the average fees of students sponsored by employer with number 02

Q 5   State and describe the measures of correctness for fragmentation in distributed database systems. **[6 marks]**