

[BCT056]

**UNIVERSITY OF BOLTON**  
**RAS AL KHAIMAH CAMPUS UAE**  
**SCHOOL OF BUSINESS & CREATIVE**  
**TECHNOLOGIES**  
**COMPUTING PATHWAY**  
**SEMESTER 1 EXAMINATION 2010/2011**  
**DATABASE THEORY AND PRACTICE**  
**MODULE NO: CST2503**

Date: Tuesday 18<sup>th</sup> January 2011

Time: 14:00 – 16:00

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**INSTRUCTIONS TO CANDIDATES:** There are SIX questions.

Answer any **FOUR**

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**Question 1**

Given the following four tables called student, modul, modulocc, studregoccur

StudentID	Surname	Inits	Sex
0604321	Williams	J	F
0607357	Patel	I	M
0610231	Jones	D	M
0615763	Wong	L	F
0618853	Taylor	T	M

Modulid	Modulname	Level
C113	Visual Programming 1	1
C116	Information Systems	1
C120	Intro to Programming	1
C205	Database	2
C213	Visual Programming 2	2
C218	Object Oriented Prog	2
C320	Advanced Database	3

ModulID	Acyear	Sem	OccLetter
C113	08/9	1	C
C113	08/9	2	C
C116	08/9	1	A
C120	08/9	1	A
C205	08/9	1	A
C205	08/9	1	B
C320	08/9	2	C
C320	08/9	2	D

ModulID	Acyear	Sem	OccLetter	StudentID	Result
C113	08/9	1	C	0604321	F
C113	08/9	1	C	0607357	P
C113	08/9	1	C	0610231	P
C113	08/9	1	C	0618853	P
C113	08/9	2	C	0610231	P
C113	08/9	2	C	0615763	P
C116	08/9	1	A	0610231	P
C116	08/9	1	A	0615763	P
C116	08/9	1	A	0618853	P
C120	08/9	1	A	0604321	F
C120	08/9	1	A	0610231	P
C205	08/9	1	A	0607357	P
C205	08/9	1	A	0610231	P
C205	08/9	1	A	0618853	P
C205	08/9	1	B	0604321	F
C205	08/9	1	B	0615763	P

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**Question 1 continues over the page....**

**Question 1 continued....**

- a) Indicate which combination of field(s) would make the primary key for the table called studregoccur, and explain your choice.

**[4 marks]**

- b) Draw an ER diagram for the four tables

**[4 marks]**

- c) State what will be the output for the following SQL command

```
SELECT STUDENTID, COUNT(*) FROM STUDREGOCCUR  
WHERE RESULT='P' GROUP BY STUDENTID;
```

**[5 marks]**

- d) What will be the output of the second SQL command when both are run

```
CREATE VIEW STUDRES AS  
SELECT MODULID, SURNAME, S.STUDENTID, RESULT FROM  
STUDREGOCCUR R, STUDENT S WHERE  
R.STUDENTID=S.STUDENTID;
```

```
SELECT SURNAME, S.STUDENTID, MODULNAME FROM  
STUDRES S, MODUL M WHERE  
M.MODULID=S.MODULID AND RESULT='F';
```

**[6 marks]**

- e) Write an SQL command (or sequence of commands) to find how many times each module had an occurrence.

**[6 marks]**

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**Question 2**

The following tables are for modul, lecturer, canteach, prerequis

Modulid	Modulname	Level
C113	Visual Programming 1	1
C116	Information Systems	1
C120	Introductory Programming	1
C205	Database	2
C213	Visual Programming 2	2
C218	Object Oriented Prog	2
C320	Advanced Database	3

LecturerID	Surname	Forename	Boss	Sex
A100	Lager	John	A104	M
A101	Williamson	John	A104	M
A104	Tiller	Ann	A107	F
A106	Dewsbury	Amanda	A107	F
A107	Goodman	Justine		F

LecturerID	ModulID
A101	C113
A102	C113
A101	C205
A100	C205
A100	C213
A104	C320
A106	C218
A106	C116
A107	C116

ModHasNeed	Modneeded
C213	C113
C218	C120
C218	C116
C320	C205
C205	C116

- a) Explain the purpose of the table called prerequisite. **[2 marks]**
- b) Draw an ER diagram for the four tables **[4 marks]**

**Question 2 continues over the page....**

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**Question 2 continued....**

- c) What would be the output from the following SQL command

```
SELECT M.MODULNAME, N.MODULNAME FROM  
MODUL M, MODUL N, PREREQUIS P WHERE  
P.MODHASNEED = M.MODULID AND  
P. MODNEEDED=N.MODULID;
```

**[4 marks]**

- d) Write an SQL command which gives a list of employee surnames and the surnames of their boss, in the sequence of the boss. **[8 marks]**
- e) Explain the purpose of each of the next two commands and indicate what output there would be from the second command.

```
CREATE VIEW ONLYONELECT AS SELECT MODULID FROM  
CANTEACH GROUP BY MODULID WHERE COUNT(*)=1;
```

```
SELECT MODULNAME FROM MODUL M, ONLYONELECT N  
WHERE M.MODULID=N.MODULID
```

**[7 marks]**

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**Question 3**

- a) An organisation has a set of vehicles available for use by staff; they have developed an Access database containing a table of reservations for vehicles, a table of vehicles and other tables to support the operation of the organisation.

They wish to create an interface that supports the process of selecting a vehicle for a potential reservation; the potential reservation will have start and end dates for which a vehicle is required.

Note - assume that any vehicle might be suitable for each request.

Draw a rough sketch illustrating how data could be displayed on a screen to achieve the 'vehicle selection' task and describe the queries that could be used to present the interface. Your explanation should include any new table that is needed.

RSVTN (RsvtnID, CustomerID, VehicleID, StartDate, EndDate)

VEHICLE(VehicleID, make, model) **[10 marks]**

- b) When working with PHP and MYSQL, it is possible to create an interface where the user enters data values that will be added to two different tables such as order and orderline.

If the order table has a primary key field of type 'autoincrement' then the value created will also be needed as part of the data to be added to the OrderLine table.

Explain in detail how a computer program can determine the value that has been created for an auto-increment field when a new record is added with an INSERT command. **[10 marks]**

- c) Database theory treats individual fields as 'atomic'; explain what is meant by this term and assess the use of the SUBSTR function with respect to this concept. **[5 marks]**

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**Question 4**

- a) Explain what is meant by the terms primary key and foreign key and indicate how their presence is documented on a two entity system.

**[3 marks]**

- b) Describe the effect of trying to execute the following commands into a table called 'stock' that has a field called PartNo as a primary key, as well as fields called Descr and QOH. Assume the table is initially empty.

```
INSERT INTO STOCK FIELDS (Partno,Descr,QOH) VALUES  
( 'P101', 'Widget', 17);
```

```
INSERT INTO STOCK FIELDS (Partno,Descr,QOH) VALUES  
( 'P102', 'Splidge', 23);
```

```
INSERT INTO STOCK FIELDS (Partno,Descr,QOH) VALUES  
( 'P101', 'Widget Mark B', 0);
```

```
INSERT INTO STOCK FIELDS (Descr,QOH) VALUES ( 'Flunge', 17);
```

**[4 marks]**

- c) If there is a table called Car with Regno as a primary key, and a second table called usij with Regno specified as foreign key which references Regno, and a field called Voucher as the primary key. What will be the effect of the following commands ?

```
INSERT INTO CAR FIELDS(Regno,Make) VALUES ( 'ETE444', 'Rover');
```

```
INSERT INTO CAR FIELDS(Regno,Make) VALUES ( 'VTE17L', 'Ford');
```

```
INSERT INTO CAR FIELDS(Regno,Make) VALUES ( 'ETE445', 'Honda');
```

```
INSERT INTO USIJ FIELDS(Voucher,Regno) VALUES ( '100', 'ETE444');
```

```
INSERT INTO USIJ FIELDS(Voucher,Regno) VALUES ( '101', 'ETE454');
```

```
INSERT INTO USIJ FIELDS(Voucher,Regno) VALUES ( '102', 'VTE17L');
```

```
INSERT INTO USIJ FIELDS(Voucher,Regno) VALUES ( '100', 'ETE445');
```

**[6 marks]**

**Question 4 continues over the page....**

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**Question 4 continued....**

- d) What would happen after the above sequence in part c) if the following commands were submitted ?

```
DELETE FROM CAR WHERE REGNO='ETE445';  
DELETE FROM CAR WHERE REGNO='ETE444';  
DELETE FROM USIJ WHERE VOUCHER='102';
```

**[6 marks]**

- e) If part c) had used the clause 'ON CASCADE DELETE' , what would the results to the following if they were run immediately after part c)

```
DELETE FROM CAR WHERE REGNO='ETE444';  
DELETE FROM CAR WHERE REGNO='VTE17L';  
DELETE FROM USIJ WHERE VOUCHER='102';
```

**[6 marks]**

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**Question 5**

- a) Describe briefly the three stages of normalisation **[6 marks]**
- b) Explain what the result of normalisation is **[4 marks]**
- c) The following is a copy of a delivery note. Normalise the contents to third normal form. **[15 marks]**

Marshall Supplies Ltd  
 66, Smithson Street  
 Manchester M35 3HG

INVOICE: *Smiths Hardware*  
*Victoria Square*  
*Salford*

Customer: *C105*  
 Cust Purch No *JH37*

Date: *25<sup>th</sup> May 2009*

Prod Code	Description	Quantity	Unit Price	Ext Price
<i>ZX822</i>	<i>Hex Bolt 22mm</i>	<i>120</i>	<i>2.40</i>	<i>288.00</i>
<i>QR273</i>	<i>Alum Washers 10mm</i>	<i>50</i>	<i>3.00</i>	<i>150.00</i>
<i>KJ34</i>	<i>Wood screws 8mm</i>	<i>144</i>	<i>1.50</i>	<i>216.00</i>

Total 654.00

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**Question 6**

An organisation has developed a simple database for sales order processing with the following four tables. The data is needed to generate quotations, accept orders, print delivery notes and print invoices.

Customer (CustID, CustName, Add1, Add2, Postcode)

OrderHD (OrderNo, CustID, Date)

OrderLine (OrderNo, PartID, Quantity)

Stock (PartID, Description, Price, QOH)

They realise that the system is not complex enough to deal with their business as it will not cope with the following problems.

*The organisation sends out quotations based on the above tables, but when the customer places their order, the price has changed.*

*The customer discovers that the product is faulty and expects a credit note for the price paid, but the price has changed.*

*There is no facility to perform a credit check on a customer that takes into account their credit limit and current debt.*

*Sometimes the company has insufficient stock to meet the quantity ordered and so they deliver and invoice some goods immediately and more at a later date.*

- a) In the existing system, what would be the field(s) to make a primary key for the OrderLine table. **[3 marks]**
- b) Draw an entity model of the existing system. **[4 marks]**
- c) Describe what tables that could be used to overcome the problems and specify their primary keys and foreign keys **[9 marks]**
- d) Draw an entity model of the new system **[9 marks]**

**END OF QUESTIONS**