







Past Papers May/June 2015 to 2018:

9608/12/M/J/15

Q9 A database has been designed to store data about salespersons and the products they have sold.

The following facts help to define the structure of the database:

-  each salesperson works in a particular shop
-  each salesperson has a unique first name
-  each shop has one or more salespersons
-  each product which is sold is manufactured by one company only
-  each salesperson can sell any of the products
-  the number of products that each salesperson has sold is recorded.

The table **ShopSales** was the first attempt at designing the database.

FirstName	Shop	ProductName	NoOfProducts	Manufacturer
Nick	TX	television set	3	SKC
		refrigerator	2	WP
		digital camera	6	HKC
Sean	BH	hair dryer	1	WG
		electric shaver	8	BG
John	TX	television set	2	SKC
		mobile phone	8	ARC
		digital camera	4	HKC
		toaster	3	GK

(a) State why the table is not in First Normal Form (1NF).

.....
.....[1]

(b) The database design is changed to:

SalesPerson (FirstName, Shop)

SalesProducts (FirstName, ProductName, NoOfProducts, Manufacturer)

Using the data given in the first attempt table (**ShopSales**), show how these data are now stored in the revised table designs.

Table: **SalesPerson**

FirstName	Shop

Table: SalesProducts

FirstName	ProductName	NoOfProducts	Manufacturer

[3]

(c) (i) A relationship between the two tables has been implemented.
Explain how this has been done.

.....
.....
.....
.....
.....[2]

(ii) Explain why the SalesProducts table is not in Third Normal Form (3NF).

.....
.....
.....[2]

(iii) Write the table definitions to give the database in 3NF.

.....
.....
.....[2]



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Q.8 A school stores a large amount of data. This includes student attendance, qualification, and contact details. The school’s software uses a file-based approach to store this data.

(a) The school is considering changing to a DBMS.

(i) State what DBMS stands for.

.....[1]

(ii) Describe two ways in which the Database Administrator (DBA) could use the DBMS software to ensure the security of the student data.

1
.....
.....

2
.....
.....[4]

(iii) A feature of the DBMS software is a query processor. Describe how the school secretary could use this software.

.....
.....
.....[2]

(iv) The DBMS has replaced software that used a file-based approach with a relational database.

Describe how using a relational database has overcome the previous problems associated with a file-based approach.

.....
.....
.....[3]

(b) The database design has three tables to store the classes that students attend.

STUDENT(StudentID, FirstName, LastName, Year, TutorGroup)

CLASS(ClassID, Subject)

CLASS-GROUP(StudentID, ClassID)

Primary keys are not shown. There is a one-to-many relationship between **CLASS** and **CLASS-GROUP**.

(i) Describe how this relationship is implemented.

.....
.....[2]

(ii) Describe the relationship between **CLASS-GROUP** and **STUDENT**.

.....[1]



(iii) Write an SQL script to display the **StudentID** and **FirstName** of all students who are in the tutor group 10B. Display the list in alphabetical order of **LastName**.

.....
.....
.....
.....[4]




(iv) Write an SQL script to display the **LastName** of all students who attend the class whose **ClassID** is CS1.

.....
.....
.....
.....
.....
.....
.....[4]

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Answers:

9(a) Any one from:

-  (ShopSales) table has repeated group (of attributes)
-  each sales person has a number of products
-  FirstName, Shop would need to be repeated for each record [1]

(b) One mark for SalesPerson table

table: SalesPerson

FirstName	Shop
Nick	TX
Sean	BH
John	TX

table: SalesProducts

FirstName	ProductName	NoOfProducts	Manufacturer
Nick	television set	3	SKC
Nick	refrigerator	2	WP
Nick	digital camera	6	HKC
Sean	hair dryer	1	WG
Sean	electric shaver	8	BG
John	television set	2	SKC
John	mobile phone	8	ARC
John	digital camera	4	HKC
John	toaster	3	GK

(c) (i) Any two from:

- primary key of SalesPerson table is FirstName
- links to FirstName in SalesProducts table
- FirstName in SalesProductsS table is foreign key

[2]

(ii)

- There is a non-key dependency
- Manufacturer is dependent on ProductName, (which is not the primary key of the SalesProducts table)

[2]

(iii) SalesPerson (FirstName, Shop)

–SalesProducts (FirstName, ProductName, NoOfProducts) OR SalesProducts (SalesID, FirstName, ProductName, NoOfProducts)







-Product (ProductName, Manufacturer)

1 mark for correct attributes in SalesProducts and Product tables and 1 mark for correct identification of both primary keys [2]




Answers
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8 (a) (i) Database Management System [1]

Maximum of two marks per method. Maximum of two methods. [4]

-  Issue usernames and passwords...
 - stops unauthorised access to the data
 - any further expansion e.g. strong passwords / passwords should be changed regularly etc...
-  Access rights / privileges...
 - so that only relevant staff / certain usernames can read/edit certain parts of the data
 - can be read only, or full access / read, write and delete
 - any relevant example e.g. only class tutors can edit details of pupils in their tutor group
-  Create (regular / scheduled) backups...
 - in case of loss/damage to the live data a copy is available
 - any relevant example e.g. backing up the attendance registers at the end of each day and storing the data off-site/to a separate device
-  Encryption of data...
 - if there is unauthorised access to the data it cannot be understood // needs a decryption key
 - any relevant example e.g. personal details of pupils are encrypted before being sent over the Internet to examination boards
-  Definition of different views...
 - composed of one or more tables
 - controls the scope of the data accessible to authorised users
 - any relevant example e.g. teachers can only see their classes
-  Usage monitoring / logging of activity...
 - creation of an audit /activity log
 - records the use of the data in the database / records operations performed by all users / all access to the data
 - any relevant example, e.g. Track who changed a student's grade

(iii) Two points from: [2]

-  Set up search criteria
-  To find / retrieve / return the data that matches the criteria
-  Any relevant example e.g. find pupils who were absent on a particular day