



Databases

4 June 2024

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Answer ALL questions

Marks

Question 1

- a) Identify FOUR (4) **entities** that a Car Rental may store data about. **4**
- b) State FOUR (4) reasons why a small bakery might **NOT** want a Database Management System (DBMS) **4**
- c) Explain the term **Database Schema**. **2**

Total 10 Marks

Question 2

The following table is from a dental practice database which is in *Third Normal Form* (3NF). Suggest appropriate data types, field lengths (if applicable) **and** keys (if applicable) for the attributes listed. **10**

Attribute Name	Data Type	Field Length	Key
AppointmentID			
PatientID			
Date			
Time			
DentistID			
AppointmentReason			

Total 10 Marks

Question 3

A cruise liner accepts passengers onto its ship. It allocates rooms to passengers depending on the passenger's original booking requirements. Once on board, passengers pay for food, drink and gifts by charging them to their room. At the end of the cruise, passengers settle their room bill by making a payment to clear the balance. **10**

Identify FIVE (5) entities that you think would form part of a proposed database system and clearly define their purpose.

Total 10 Marks

Questions continue on the next page

Question 4

- a) Explain the purpose of a CRUD matrix ensuring you provide details about how it assists and supports the database design process. 4
- b) Identify **and** describe THREE (3) possible table constraints that could be added to a vehicle hire database. 6

Total 10 Marks

Question 5

Consider the following tables:

tblStaff

StaffID	FName	SName	DeptID	Salary
1	Ali	Ali	3	32000
2	Martin	Shein	1	27900
3	Sarah	Ahmed	3	34175
4	Toni	Braxton	2	33800

tblDepartment

DepartmentID	DepartmentName
1	Human Resources
2	Payroll
3	Production
4	Admin

- a) Sarah Ahmed has moved departments from Production to Human Resources. Write the SQL that will change the data to represent this move. 3
- b) Create a new Department called Distribution. 3
- c) The Payroll department is being merged into the Human Resources department. Remove the record from the Department table. 4

Total 10 Marks

Questions continue on the next page

Question 6

- a) The following table is taken from a database model being developed for a bakery. 6

tblBakeryItem

ItemID	ItemName	ItemPrice	Days_ShelfLife
1	Seeded Loaf	1.86	3
2	Cream Éclair	1.75	1
3	Victoria Sponge	2.49	2

Write an SQL statement that will create the table.
Ensure you specify appropriate data types and keys (where applicable)

- b) Consider the following table. 3

tblStock

StockID	Name	Type	StockQTY
1	Rotary Widget	Widget	12
2	No. 7 screws	Screw	123
3	Double sided widget	Widget	1000

Write the SQL statement that will add up all of the stock quantity for all of the Widget stock types.

- c) What is the purpose of the MIN statement when used in an SQL statement? 1

Total 10 Marks

Question 7

- a) Explain the purpose of normalisation ensuring that you describe why it is necessary to split data into separate tables. 4
- b) Identify **and** explain THREE (3) concepts of a relational model. 6

Total 10 Marks

Questions continue on the next page

Question 8

- a) Consider the following table that exists within a company database that allows registered customers to purchase a range of tools from its store.

5

Customer ID	Customer Name	Customer Product	Product Price
102	Isobel Dodd	Drill set	35.99
103	Ramjit Khan	Multi-head screwdriver	11.49
103	R kahn	Mixed screw set	9.99
104	Alice Sadiq	Hammer	14.59
105	Tom Sayer	Saw	
106	Kim Lataya	Mixed screw set	9.99
102	Isobel Dodd	Multi-Head screwdriver	12.99

Provide an analysis of THREE (3) faults that you can identify with the table and dataset provided.

- b) Draw an Entity Relationship Diagram (ERD) of a new table structure to solve the problems in the table shown in part (a). You should use the principles of good database design. Ensure cardinality is shown.

5

Total 10 Marks

Question 9

A bank has an old flat-file-based system that is in need of updating.

10

The bank allows people to open a range of different accounts such as Current, Savings, Loan and Mortgage accounts. Some accounts are restricted to people over the age of 18.

Customers will receive regular statements that show a list of transactions that have been made on their accounts.

Identify **and** describe FIVE (5) potential entities that might be included in a new Database Management System. Ensure you provide a clear purpose for each of the entities identified.

Total 10 Marks

Questions continue on the next page

Question 10

State **and** explain FIVE (5) security measures that could be applied to protect a DBMS. **10**

Total 10 Marks

End of Paper