

[3]

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- (d) A Database Management System (DBMS) is used to maintain and manage the database.

Describe **two** ways in which the DBMS can be used to ensure the security of the customer data.

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[4]

Question 6 starts on the next page.

- 6 A shop sells pens to customers. Customers place an order with the shop and collect the items the next day. The shop uses a database to store the information about the orders.

The database contains the following tables:

CUSTOMER(CustomerID, CustomerName, Email)

ORDER(OrderID, CustomerID, Date, Collected)

ORDER_PRODUCT(OrderID, ProductID, Quantity)

PRODUCT(ProductID, ProductName, QuantityInBox, Cost, SupplierID)

SUPPLIER(SupplierID, SupplierName, SupplierEmail)

The primary keys are underlined.

- (a) Complete the entity-relationship (E-R) diagram for the database.



[4]

- [illegible]

- [illegible]

4 A company makes ice cream and sells it to shops.

The ice cream is made in batches: a large quantity of one type and flavour of ice cream that is then split into smaller quantities for sale.

The company’s owner has designed a relational database, ICECREAM, to store data about their ice cream and customers.

Some of the tables in the database are given. The database is not normalised.

```
BATCH(BatchID, Type, Flavour, Size, SellingPrice, EndDate)

CUSTOMER(CustomerID, CompanyName, EmailAddress, TelephoneNumber)

SALE(SaleID, BatchID, CustomerID, Quantity, Date)
```

- (a) Identify **two** foreign keys in the table SALE and the table that each foreign key references.
- Foreign key 1

Table name 1

Foreign key 2

Table name 2
- [2]
- (b) Write an SQL script to return the total quantity of ice cream sold to the customer with the ID of 0034E in the year 2023.
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- (c) The table definition for BATCH is repeated here:
- ```
BATCH(BatchID, Type, Flavour, Size, SellingPrice, EndDate)
```
- Sample data for the table BATCH is given:

| BatchID | Type      | Flavour   | Size | SellingPrice | EndDate    |
|---------|-----------|-----------|------|--------------|------------|
| KIV12   | Plain     | Vanilla   | 1    | 2.20         | 12/12/2024 |
| RIC14   | Plain     | Chocolate | 0.5  | 1.80         | 12/12/2024 |
| TYL1    | Non-dairy | Lemon     | 0.5  | 2.10         | 01/02/2025 |
| FYV2    | Non-dairy | Vanilla   | 0.25 | 1.50         | 02/02/2025 |
| BIV13   | Plain     | Vanilla   | 1    | 2.20         | 02/02/2024 |

- (i) Write an SQL script to define the table BATCH.
- Include constraints (restrictions) on the data that can be entered into each field where appropriate.
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- [5]

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| Database term | Definition                          |
|---------------|-------------------------------------|
| Entity        | <div></div> <div></div> <div></div> |
| Attribute     | <div></div> <div></div> <div></div> |

[2]

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