



Databases

23 November 2023

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) The DB Development Company has just recruited a trainee Database Developer. **4**

You have been asked to explain the term 'Relational Database'.

Write a paragraph that will explain the term to them.

- b) A café wants to computerise the administration side of its business. **6**

Provide THREE (3) advantages that a database might bring to their business and ensure you provide a justification or explanation for each one.

Total 10 Marks

Question 2

The following Employee Job Role table is from an employee database which is in *Third Normal Form (3NF)*. **10**

The 'Change Reason' field requires some brief commentary about the reason for the change of employee role.

AuthorisedID is the Employee ID of the staff who has authorised the change.

Suggest appropriate data types, field length (if applicable) **and** keys (if applicable) for the attributes listed.

| Attribute Name | Data Type | Field Length | Key |
|------------------|-----------|--------------|-----|
| EmployeeID | | | |
| JobRoleID | | | |
| CommencementDate | | | |
| Salary | | | |
| EndDate | | | |
| ChangeReason | | | |
| AuthorisedID | | | |

Total 10 Marks

Questions continue on the next page

Question 3

An owner of several countryside properties would like to rent them out as short-term holiday rentals.

Guests wanting to stay at ONE (1) of the properties would look on the owner's website to find suitable accommodation and then contact the owner by phone or email to enquire about availability and booking.

- a) Draw an ERD, complete with cardinality and an outline of a database structure that would support this. **5**
- b) For each of the entities identified suggest appropriate PRIMARY and FOREIGN keys. Ensure you include the attribute name **AND** the entity they belong to. **5**

Total 10 Marks

Question 4

South-View Park Adventures is a country park that has a free children's play area, a boating lake, a café, and a petting zoo. All of the areas and equipment within the park need to be cleaned and maintained on a regular basis. **10**

The management would like to organise the park's operations and is interested in commissioning a database to be developed.

Identify **and** describe FIVE (5) potential entities that might be included in a proposed database system. Ensure you provide a purpose for each of the entities identified.

Total 10 Marks

Question 5

The following table is taken from a database model being developed for a vet practice that offers a monthly treatment subscription to dog owners (rather than paying for any treatment that may be required all at once).

tblSubscription

| SubID | Name | MonthlyCost |
|-------|-------------------|-------------|
| 3 | Dogs under 1 year | 19.99 |
| 4 | Dogs 1-4 | 26.99 |
| 5 | Dogs 5-8 | 37.99 |

- a) Write an SQL statement that will create the table. **5**
Ensure you specify appropriate data types and any keys.

Note that you do not need to create the statement to populate the table.

Questions continue on the next page

- b) The following table has been taken from a bakery database.

tblItem

| ItemID | Name | Price | Type |
|--------|------------------|-------|---------|
| 3 | Apple Turnover | 1.65 | Sweet |
| 4 | Sausage Roll | 1.80 | Savoury |
| 5 | Cheese Roll | 1.75 | Savoury |
| 6 | Croissant | 1.60 | Sweet |
| 7 | Custard Doughnut | 2.10 | Sweet |

Due to rising costs in sugar, the bakery needs to increase some of its prices.

Write an SQL statement that will increase the price of all sweet bakery items by 15%.

- c) Consider the following table that has been taken from a government's vehicle registration database.

2

tblVehicle

| VehicleID | VehicleType | Make | Model | ProdYear | Status |
|-----------|-------------|-------|-----------|----------|---------|
| 3174 | Car | Adeje | City | 2009 | Fail |
| 3214 | HGV | Gord | Bansit | 2012 | Service |
| 3356 | Car | Howlo | H-70 | 2008 | Fail |
| 3513 | Motorcycle | Sondo | X-Press20 | 2010 | Service |

Write an SQL statement that will Delete all of the records from the table where the vehicle status is set to Fail.

Total 10 Marks

Question 6

- a) Consider the following table that has been extracted from a Gym database.

3

tblMonthlySubs

| MemberID | MemberType | MonthlyPayment |
|----------|------------|----------------|
| 317 | Silver | 25 |
| 892 | Gold | 32 |
| 1417 | Gold | 32 |
| 1652 | Bronze | 21 |

Write the SQL statement that will total the monthly payment column.

Questions continue on the next page

- b) Consider the following table that has been extracted from a student database system.

tblPupils

| PupilID | FirstName | LastName | DOB |
|---------|-----------|----------|-----------|
| 4719 | Henry | Gibbons | 1/7/2016 |
| 5194 | Zola | Lynons | 28/5/2016 |
| 5911 | Sobia | Ahmed | 4/8/2016 |

Write an SQL Statement that will list all student details where their last name starts with the letter G.

- c) Consider the following table that has been extracted from a toy shop database.

tblToy

| ToyID | ToyName | Type | Price |
|-------|------------------|------------|-------|
| 311 | Gork Robot | Electronic | 65.99 |
| 817 | Leon Lion Jigsaw | Jigsaw | 13.99 |
| 1147 | Dentist Dan | Electronic | 24.99 |

Select the Toy Name **and** the price of all electronic type toys under the price of 32.99.

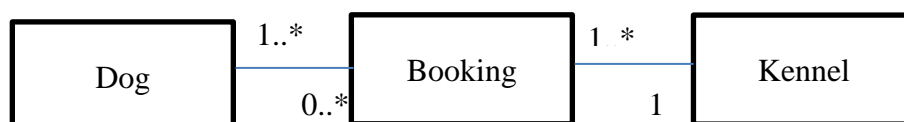
Total 10 Marks

Question 7

- a) Consider the ER diagram shown below.

5

It shows an outline for a dog kennel boarding system in which owners can book their dogs in to kennels for a specified duration.



A database is being developed to help keep records at a dog kennel.

Create a CRUD matrix that will show the following transactions.

1. Insert a new dog.
2. List details of all kennels
3. Update the facilities of a kennel.
4. Add a booking.
5. Amend an existing booking.

- b) Identify THREE (3) main differences between flat-file and relational database systems.

3

Questions continue on the next page

Marks

c) State the purpose of the following terms:

- | | |
|-------------|---|
| i) Rollback | 1 |
| ii) Commit | 1 |

Total 10 Marks

Question 8

a) Pre-RDBMS relied on a 'batch-processing' method for transactions. **2**

Describe the term 'Batch processing' **and** use an example to help.

b) Identify TWO (2) properties of a candidate key. **2**

c) Explain the difference between data **and** information. You should use appropriate examples to help you explain your answer. **4**

d) Provide TWO (2) examples of features that CASE tools provide. **2**

Total 10 Marks

Question 9

The 'Star' Dance Company advertises weekly dance classes that students can book. **10**
Some classes are for certain age groups, e.g., 3-7, 8-14, 14+. Classes may have different prices.

Once a booking has been made, the student (or parent/guardian) will be contacted to obtain payment information.

Based on the scenario above, provide a list of attributes for UNF, noting that you do not need to normalise the attributes.

Total 10 Marks

Questions continue on the next page

Question 10

- a) Consider the following table which has been taken from a library system.

4

tblBorrower

| BorrowerID | FirstName | LastName | DOB |
|------------|-------------|------------|------------|
| 5112 | Christopher | Prince | 1/7/1984 |
| 5195 | Priti | Schumacher | 27/12/1991 |
| 5196 | Scarlet | O'Hara | 12/3/1989 |

Write an SQL statement that will add the following data to the table.

| | | | |
|------|-----|-------|-----------|
| 6483 | Uma | Patel | 23/3/1972 |
|------|-----|-------|-----------|

- b) Identify TWO (2) examples of Metadata in a DBMS.

2

- c) Describe the purpose of the following SQL command words:

i) Group By

1

ii) Count

1

iii) Max

1

iv) Avg

1

Total 10 Marks

END OF PAPER