



Databases

16 March 2023

Time-Controlled Assessment Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 4 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**

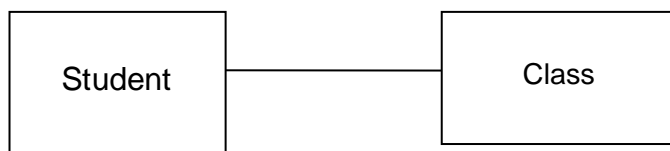
- a) Identify FOUR (4) reasons why a bank will use a database. **4**
- b) Identify FOUR (4) types of entities about which a Theme Park (an amusement style park like Disney) might store data. **4**
- c) Airlines use real time passenger database booking systems. State TWO (2) problems that could occur with such a system. **2**

Total 10 Marks**Question 2**

- a) The following table is from a manufacturing company's database which is in *Third Normal Form* (3NF). Suggest appropriate data types, field length (if applicable) and keys (if applicable) for the attributes listed. **7**

Attribute Name	Data Type	Key
ComponentID	Number (Auto increment)	Primary Key
ComponentName		
Weight		
QtyInStock		
Price		
SupplierID		
EffectiveDate		

- b) Consider the *Entity-Relationship (ER) diagram* below for a school database system. **1**



Identify the issue with the current diagram.

- c) From a school database system, identify TWO (2) attributes from a student table that could be identified as Secondary keys. **2**

Total 10 Marks**Question continues on the next page**

Question 3

Consider the following scenario shown below:

A multi-screen cinema complex may show ONE (1) or multiple screenings of a movie. Tickets can only be purchased at the cinema

Each screening has a maximum number of seats available.

When customers arrive at the cinema they make a transaction to purchase ONE (1) or more tickets, each ticket will show the movie name, the start-time of the movie and the screen where the movie will be shown.

- a) Draw an *Entity-Relationship (ER) diagram* to represent the above scenario. 10
Ensure the cardinality is shown for each side of the relationships.
- b) Choose FOUR (4) entities and identify all of the primary **and** foreign keys for the entities chosen in **3(a)**. Ensure you clearly identify which entity the keys belong to otherwise you will not be awarded the maximum marks. Provide a short description of the purpose of each of the entities chosen. 10

Total 20 Marks

Question 4

- a) Consider the ER diagram shown below for an optician in which a customer can book an eye test appointment and an optometrist carries out the eye test. 5



Create a CRUD matrix to show the following transactions:

- Transaction 1 – Delete an existing optometrist
- Transaction 2 – A new customer wants to make an appointment
- Transaction 3 – A customer wants to change an existing booking
- Transaction 4 – A customer wants to cancel their appointment
- Transaction 5 – The optician appoints a new optometrist

- b) Prior to the introduction of an electronic database system a paper-based system would have been used for information management. Using an optician as an example, identify FIVE (5) potential issues/errors that the opticians may have experienced by using a manual information system. 5

Total 10 Marks

Question continues on the next page

Question 5

Consider the following tables:

tblRoom

RoomID	RoomType	MaxGuests	DailyPrice
101	Executive	2	450
201	Luxury Double	2	325
301	Family Suite	4	299
401	Standard Double	2	250
501	Standard Twin	2	250

tblGuest

GuestID	FName	SName	DOB
1	Elizabeth	Swires	12/09/1982
2	Ashraf	Patel	01/02/1975
3	Floella	Benjamin	27/04/1965
4	Andrew	Gough	30/06/1999

tblBooking

BookingID	GuestID	RoomID	ArrivalDate	NoOfDays	NoGuests
1092	4	301	12/03/2023	3	3
1099	2	101	14/03/2023	5	2
1298	1	201	14/03/2023	3	2
1432	3	501	15/03/2023	5	2
1678	4	301	19/03/2023	3	3
1881	1	201	21/03/2023	6	1

- a) Write an SQL statement that will increase the prices of all rooms by 5%. 2
- b) Write an SQL statement that will add the following information to the guest table. 3

Lewis	Paltro	16/12/2000
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- c) Write the SQL that produces a list with all guest and room details of all the bookings between 13th March 2023 and 16th March 2023. 3
- d) Write an SQL statement that will add a new field to the room table called Bath which will hold a True/False field. 4
- e) Write the SQL that will create the following table and add the data below to the newly created table. 8

tblRoomService

ItemID	Name	Price
1	Fries	2.95

Total 20 Marks

Question continues on the next page

Question 6

The list of attributes in Table 1 below has been identified from a company's filing system by a systems analyst. The department is dependent on the job role, and the salary is dependent on the job role.

10

Normalise the list to First Normal Form (1NF). You should carefully explain what steps you took to make the table into 1NF.

Show your newly revised table(s) and clearly identify any Primary and Foreign Keys.

EmployeeName
DOB
Address
Department
JobRole
Salary
EmploymentDate

Table 1 – List of attributes

Total 10 Marks**Question 7**

A car rental company has several branches. It currently has an internet based database system that it uses to manage the rental of its vehicles to customers.

10

Staff at branches have different levels of access depending upon their job role.

You have been recruited as a Database Administrator and you have discovered there's a number of issues surrounding the security of data and the lack of back-up of information and data.

Identify FIVE (5) measures you would want to implement due to the lack of data security and lack of back-ups and justify each ONE (1) of your FIVE (5) measures.

Total 10 Marks

Question continues on the next page

Question 8

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|-----------|--|----------|
| a) | State TWO (2) reasons for carrying out normalisation. | 2 |
| b) | Describe the difference between Optionality and Cardinality. | 2 |
| c) | State ONE (1) example of hardware and ONE (1) example of software within a database context and state their purpose. | 4 |
| d) | What is the difference between VARCHAR (30) and CHAR(30)? | 2 |

Total 10 Marks

END OF PAPER