PAST PAPER QUESTIONS

1. Tables can be related by different types of relationships. State the type of relationship between the two tables in each case below.

   a) People and Hobbies   1

   b) Jockeys and Horses in a horse race   1

2. A hardware company uses a relational database with the four tables shown below.

Customer	Item	Order	Sale
Customer ID	*Item ID*	*Order no*	Order no *
Customer name	Description	Customer ID *	Item ID *
Customer address	Cost	Date	Quantity
Customer email	Image		

   a) A database table may have a compound key. State what is meant by the term compound key.   1

   b) Identify a suitable compound key for the **Sale** table.   1

   c) Draw an *entity-relationship diagram* to illustrate the relationships between the four tables.   3

3. EcoCaledonia recruits employees using an online application form. Rowena completes her form and receives the feedback below:

   State the most appropriate data type used to store the value of the "receive information" check box.   1

4. BorrowABike is a company that hires bikes to customers for one day. They have a relational database with three tables as shown below.

Members	Bikes	Hire
MemberID	BikeID	MemberID*
Name	Colour	BikeID*
Address	Wheelsize	HireDate
Phone		Cost

a) Explain why a compound key is required for the Hire table. 1

b) The data dictionary for a table includes the field name. State **two** other items that would be specified in a data dictionary. 2

5. Isnaeworld also allows customers to book tickets for specific attractions within the theme park. Isnaeworld uses a relational database to store bookings for each attraction. The relational database has four tables as shown below.

Customer	Attraction Booking	Theme Park	Attraction
Customer ID	Customer ID*	Park ID	Attraction ID
First Name	Attraction ID*	Name	Park ID*
Surname	Card Number	Town	Manufacturer
Member Status	Ref Number	Postcode	Category
	Date		

Draw an entity relationship diagram to show the relationships between the four tables. 3

6. Super Taxi allows users to book taxis from their smartphones. Super Taxi uses a relational database to keep a record of their cars, drivers, bookings and customers. Each driver can only drive one car but the same car can be used by more than one driver. The cost is set at the time of booking.

Car	Driver	Booking	Customer
Registration	Driver ID	Booking ID	Customer ID
Make	First Name	From	Known As
Model	Surname	To	Card Number
Licence Expires	Mobile	Cost	Expiry Date
	Registration*	Driver ID*	Authorisation Code
		Customer ID*	

a) Draw an entity relationship diagram to show the relationships between the four tables. 3

b) A query is used to generate the report shown below. This report is displayed on a customer's smartphone once a booking is confirmed. State the tables and fields needed to generate the report below. 3

c) State the search criteria that would identify this booking. 1

d) Write an SQL operation used to select the tables, fields and search criteria required to generate the report above. 4

7. GlenSki offers on-to-one skiing lessons at a number of ski resorts in Scotland. Instructors are based at a resort, and customers can book several lessons on one day. A relational database is used to store the data as follows.

Customer	Lesson	Resort	Instructor
CustomerID	InstructorID*	ResortID	InstructorID
FirstName	StartTime	Name	FirstName
Surname	Date	Postcode	Surname
ContactNumber	Duration	Lifts	ResortID*
EmailAddress	CustomerID*		

a) Draw an entity relationship diagram to show the relationships that exist in this database.   3

b) State the primary key used to uniquely identify the Lesson table.   1

c) The following report was generated to show an instructor a list of the lessons that they will deliver on a specific date.

GlenSki   17/12/18   Instructor: 14

Daily Schedule   Fred, your lessons today are:

Rafal Avila   9.00am

Martin Iskra   11.00am

Daniella Smith   12.15pm

Rafal Avila   3.00pm

Number of lessons: 4

The report was based on the result of a query. The report has also been used to display the "Number of lessons" using an aggregate function. Write an SQL operation used to select the data shown in the report.   5

d) State the aggregate function that has been used to display the "Number of Lessons" shown as part of this report.   1

8. Lyndsay and Jindra attend St Andrew's Primary School and Kerry attends Hillview Primary School.

   (a) Draw an entity occurrence model to illustrate the relationship between primary school and pupil.　　2

   (b) State the *cardinality* of the relationship between primary school and pupil.　　1

9. Inverdon Electrical is a small company supplying electrical goods to a few shops in the local area. The structure of the data model they intend to use is shown below.

Customer	Order	Supplier	Item
Customer number	Item number*	Supplier name	Item number
Customer name	Order date	Supplier address	Item name
Customer address	Customer number*	Supplier telephone	Price
Customer telephone	Number ordered		Photo
			Supplier name*

   (a) Draw an *entity relationship diagram* to represent this data model.　　6

   (b) The following data dictionary represents the Item entity. It has a number of missing entries which are highlighted as A, B, C, D and E. State a suitable entry for each of the missing values.　　5

Attribute	Data Type	Validation	Unique	Index	Key
Item number	A	>=1000 and <=9999	Y	Y	PK
Item name	Text		N	Y	
Price	B	>0·50 and <1000·00	N	N	
Photo	C		N	N	
Supplier name	Text	D	E	Y	FK

10. A health centre uses a single table database. Below is a record from this database. The primary key, Patient No, is created from the patient's initials and date of birth.

Patient No	HR270985
Name	Helen Robertson
Address	23 Gordon Road Perth PG3 6TY
Date of Birth	27/09/1985
Doctor's Name	Dr Ritchie
Doctor's Tel No	0845 5678348
Doctor's Room	5

   (a) State two problems with using the meaningful identifier, Patient No, as a primary key.　　2

   (b) Explain why storing the address as a single attribute is not good database design.　　2

11. Inverdon Insurance has several branches throughout the country, each with several salespersons. A sales recording system has been set up using a relational database. The data is held in the following tables.

Branch	Customer	Sale	Salesperson
Branch number	Customer number	Customer number*	Sales ID
Address	Customer name	Sales ID*	Sales name
Telephone number	Customer address	Date	Branch number*
	Customer telephone	Amount	

(a) Draw an *entity relationship diagram* to represent this data model.   6

Each month a report is produced to show the sales for each salesperson. The report for salesperson D Wilson for May is shown below:

Date	Customer	Amount
07/05/07	AcmeArtefacts	£450.00
08/05/07	Deco Designs	£250.00
15/05/07	Allied National	£1258.75
...	...	...
...	...	...
31/05/07	Logotek	£216.34
Total		**£5237.11**

(b) Name the tables and fields which would be used to produce this report.   5

(c) State the aggregate function used to calculate the total for this saleperson.   1

12. A hardware company uses a relational database with the four tables shown below.

Customer	Item	Order	Sale
Customer ID	*Item ID*	*Order no*	Order no *
Customer name	Description	Customer ID *	Item ID *
Customer address	Cost	Date	Quantity
Customer email	Image		

A report is produced each time a customer makes an order including a single total of £146·97 after the four subtotals. An example is shown below.

Customer	Mr D Gryffe	Order no	10728
	12 Gourock Crescent	Date	23/4/15

Item	Number ordered	Cost
Grease spray	1	£6·99
Bell wire (100m)	1	£8·50
Towel radiator	1	£121·50
Disposable mouse trap	2	£9·98
	Total	£146·97

(a) Write an SQL operation used to select the tables, fields and search criteria required to generate the report above.   3

(b) Write the SQL SELECT operation which creates the Total using an aggregate function and alias.   2

13. Supasonic Electronics uses a database to store order details. The data is stored in a table using the primary key and fields as shown below.

Customer No
Customer Name
Customer Address
Order Date
Item No
Description
Price (£)
Quantity

(a) Write an SQL operation which would use a computed value and alias to calculate the total for each item ordered.   2

(b) Write an SQL operation which would use an aggregate function to calculate the total bill for each sale.   2

14. A programmer decides to build a social media website. Users of the site will be able to post messages and attach media files.

A table called Messages is used to store the user messages. Some sample records from the Message table are shown below.

messageID	comment	Date	username	media
309881	Great concert last night at Glasgow Barrowlands.	03/04/2018	adasmith	30981concert.jpg
309882	Beautiful sunny day in Dundee – again!	03/04/2018	kezzam	30982sky.jpg
309884	Who will win the match tonight?	04/04/2018	aliceb	
309885	Heading home for tea!	05/04/2018	adasmith	
309886	Disappointing result yesterday :(	05/04/2018	aliceb	30986score.jpg

Write an SQL query to total the number of messages made by each user. The query should display the username and the total number of messages made.   3

15. A PlayList table is used to store details of all playlists created by Radio Lowden and details of each song are stored in a separate table called Song. These tables are part of a relational database.

Sample data for the PlayList and Song tables are shown.

Attribute	Sample
ProgrammeID	1
SongID	A34213
DatePlayed	27/05/15
TimePlayed	09:00

PlayList Table

Attribute	Sample
SongID	A34213
Title	Jack & Dee
Artist	Soozie – L
Year	1997

Song Table

Write the SQL query which will list the title of each song played on 26 May 2016.   2

16. A database table is shown below:

Table: Staff					
StaffID	Forename	Surname	Department	HourlyRate	hoursWorked
1011	Amy	Black	Admin	17.99	35
1035	Stephanie	Clark	Finance	21.99	35
1067	Billy	McEwan	Admin	11.50	27
1023	Lauren	Wilson	Admin	21.00	20
1011	Fraser	Johnston	Finance	19.50	25
1056	Josh	Jones	Admin	11.75	27

Complete the table below showing the output from the following SQL statement.   **2**

```
SELECT department, MIN(HourlyRate) AS [Lowest Paid]
FROM Staff
GROUP BY department;
```

department	Lowest Paid

17. A database table is shown below:

Table: Members					
MemberID	Forename	Surname	Membership	Location	Joint Membership
3013	Steve	Smith	Full	Ayr	No
2045	Hannah	Gates	Full	Prestwick	Yes
3097	Amy	Connor	Gym Only	Troon	No
3033	Jack	Nicol	Full	Ayr	No
3101	Paul	Lindsay	Gym Only	Ayr	Yes
3109	Lucy	James	Swim Only	Prestwick	No

a) Complete the table below showing the output from the following SQL statement.   **3**
```
SELECT membership, count(*) AS [Number of Memberships]
FROM Members
GROUP BY membership;
```

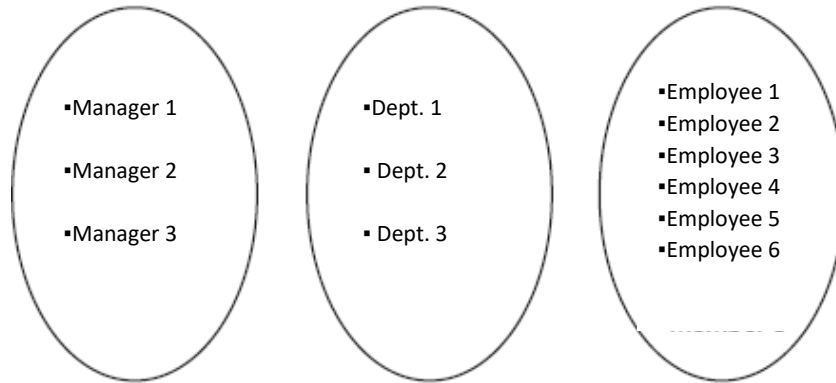|	

b) State the purpose of the GROUP BY line of the SQL statement.   **1**

18. An organisation has many employees. Each employee can only work within one department and each department has one manager.

Complete the entity-occurrence diagram below to represent the relationship between managers, employees and departments. **2**

- Manager 1

- Manager 2

- Manager 3

- Dept. 1

- Dept. 2

- Dept. 3

- Employee 1
- Employee 2
- Employee 3
- Employee 4
- Employee 5
- Employee 6

19. Complete the entity-occurrence diagram for the following data.

| School	Teacher
IC42	135
IC57	123
IC23	111
IC23	184
IC57	77
IC57	295
IC23	93
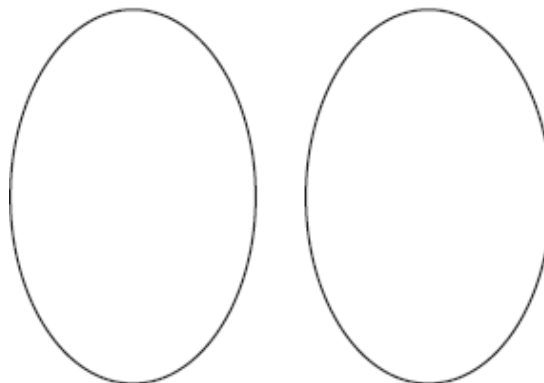
20. An SQL statement shown below will count the number of restaurants in different locations. The expected output is shown below. When the SQL statement was tested the actual output did not match the expected output. Identify two errors in the SQL statement.

```
SELECT location, COUNT(venueName)

FROM Venue

WHERE venueType = 'Restaurant'

GROUP BY venueName;
```

Location	Number of Restaurants
Glasgow	67
Edinburgh	85
Dundee	47

21. The entity relationship diagram below shows information on head teachers, schools and teachers. There are errors in the design. Describe three errors in the below design.
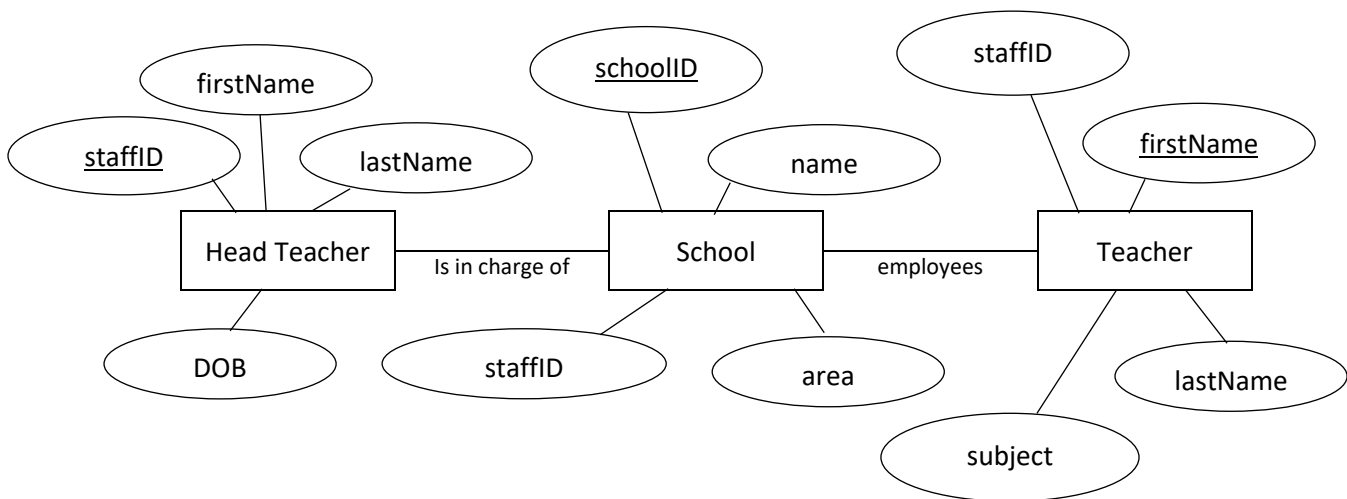
22. The holiday bookings table is shown below:

Table: Bookings					
Holiday Ref	Destination	Arrival Date	Departure Date	Package Holiday	Customer Ref
7895	Spain	1/7/2018	21/7/2018	Yes	111502
7541	Italy	23/8/2018	15/9/2018	Yes	132510
7962	France	19/4/2018	25/4/2018	Yes	189520
7456	Spain	23/7/2018	29/7/2018	No	144581
7122	Spain	21/10/2018	31/10/2018	Yes	147895
7563	Italy	26/9/2018	4/10/2018	No	123524

a) Design a query using wildcards, to find and display the destinations of all the holidays departing in October

Fields(s) and calculation(s)	
Tables(s)	
Search Criteria	
Grouping	
Sort Order	

b) Design a query to display the different destinations, together with the number of bookings for each of those destinations.

Fields(s) and calculation(s)	
Tables(s)	
Search Criteria	
Grouping	
Sort Order	

23. The assessment table is shown below:

Table: Assessment					
Pupil ID	Test Score 1	Test Score 2	Test Score 3	Test Score 4	Teacher ID
P124	89	78	91	79	T125
P458	45	51	43	59	T185
P253	67	55	68	71	T185
P112	54	67	43	55	T097
P278	37	45	37	49	T125
P896	10	35	23	41	T097

a) Write the SQL statement that would produce the following output:

Pupil ID	Total Test Score
P896	109
P278	168
P458	198
P112	219
P253	261
P124	337