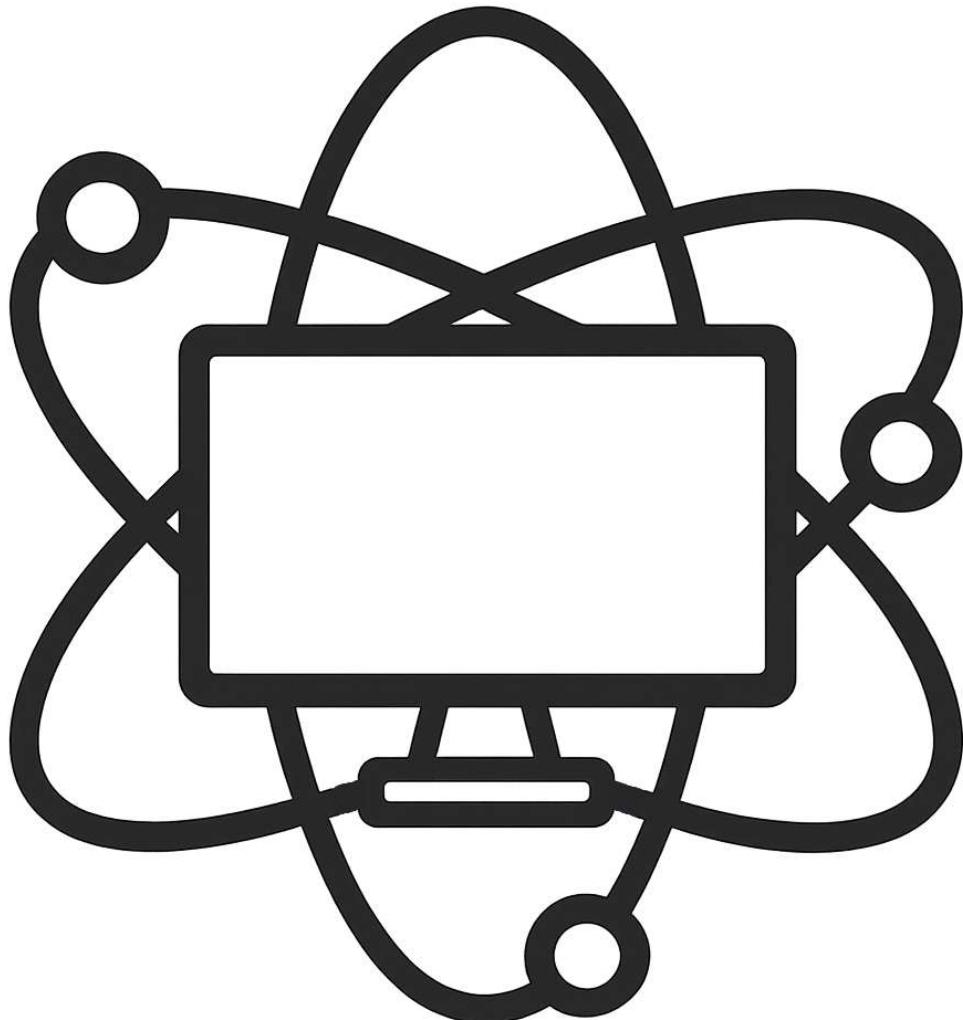


0478 IGCSE Computer Science

Mini-drill and Questions

Assessment Test Prep



Prepared by:
The ReviseRoom Educator Team

2

- 1 Binary is a number system that is used by computers.

- (a) Tick (\checkmark) one box to show whether binary is a base-2, base-10 or base-16 number system.

Tick (\checkmark)

Base-2

Base-10

Base-16

[1]

- (b) Hexadecimal and denary are number systems that can be used by programmers.

Convert these four hexadecimal values into denary values.

09

10

28

A1

[4]

Working space

- 4 Georgia is a wedding photographer. She wants to store 10 photographs on a USB flash memory drive for a customer. Each photograph is 100 pixels wide and 50 pixels high.

The photographs are 8-bit colour photographs.

- (a) Calculate the total file size, in kilobytes (kB), of all the photographs. For this calculation, you may use the unit of measurement of 1024 or 1000.

Show all your working.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Answer kB

[3]

5

- (b) Georgia compresses photographs to store them on the USB flash memory drive. It is important that the compression does **not** affect the quality of the photographs in any way.

State which type of compression is the most suitable. Justify your choice.

Compression type

Justification

.....

.....

.....

[3]

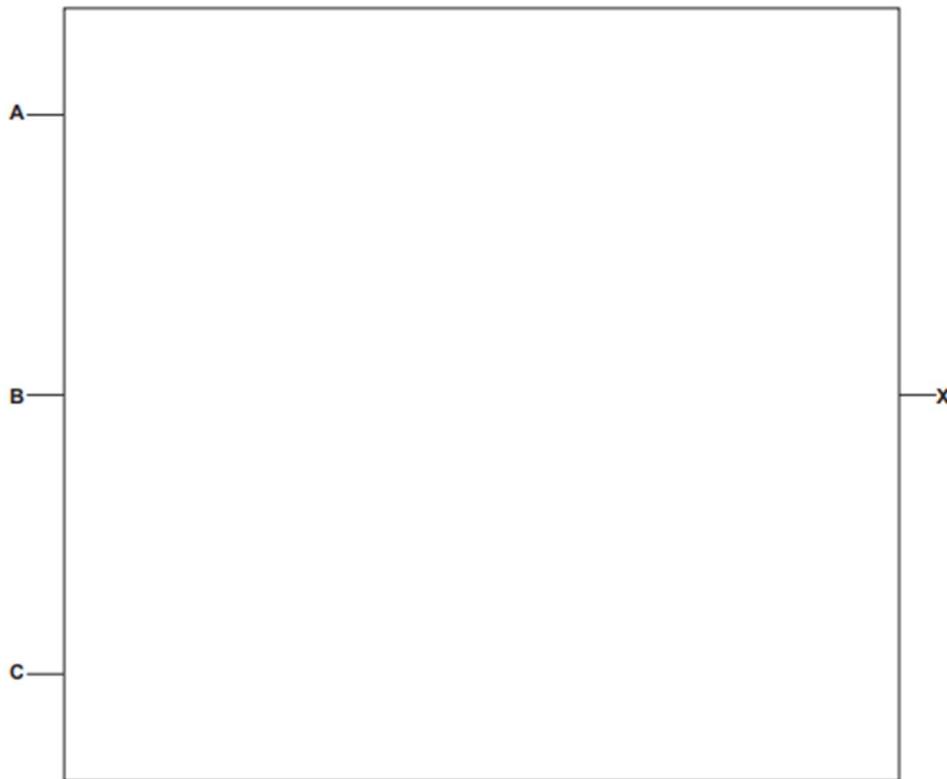
10

- 10 Consider the following logic statement:

$$X = (((A \text{ OR } B) \text{ OR } (\text{NOT } (B \text{ XOR } C))) \text{ AND } C)$$

- (a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the logic statement. All logic gates must have a maximum of two inputs.



[5]

- (b) State the name of a logic gate that does **not** appear in the logic statement and draw the symbol for the logic gate.

Name of logic gate Logic gate symbol:



[2]

2

- 1 (a) Denary is a number system that is used by programmers.

Tick (\checkmark) one box to show whether denary is a base-2, base-10 or base-16 number system.

Tick
(\checkmark)

Base-2

Base-10

Base-16

[1]

- (b) Hexadecimal values can be used to represent denary values.

Convert these four hexadecimal values into denary values.

05

20

1A

AB

[4]

- (c) Hexadecimal values can also be converted to binary values.

Tick () **one** box to show the correct 8-bit binary value for each hexadecimal value.

- (i) Hexadecimal value 25

Tick
()

00011001

00100101

10100001

[1]

- (ii) Hexadecimal value 1B

Tick
()

00011011

10110001

00011010

[1]

- (d) (i) Give **one** way that hexadecimal is used in website development.

..... [1]

- (ii) Give **one** way that hexadecimal is used in low-level programming.

..... [1]

- (b) Sammi creates videos for the finance company website that give customers advice about their finances.

He uses lossy compression to reduce the file size of the videos for the website.

- (i) Give **three** ways that lossy compression can reduce the file size of the videos.

1

.....
2

.....
3

[3]

- (ii) Give **one** drawback of using lossy compression to reduce the file size of the videos.

.....
..... [1]

- (c) Sammi could have used lossless compression to compress the videos for the website.

- (i) Give **one** reason why he would use lossless compression, rather than lossy compression, for the videos.

.....
..... [1]

- (ii) Give **two** disadvantages of Sammi using lossless compression, rather than lossy compression, for the videos.

Disadvantage 1

.....
..... Disadvantage 2

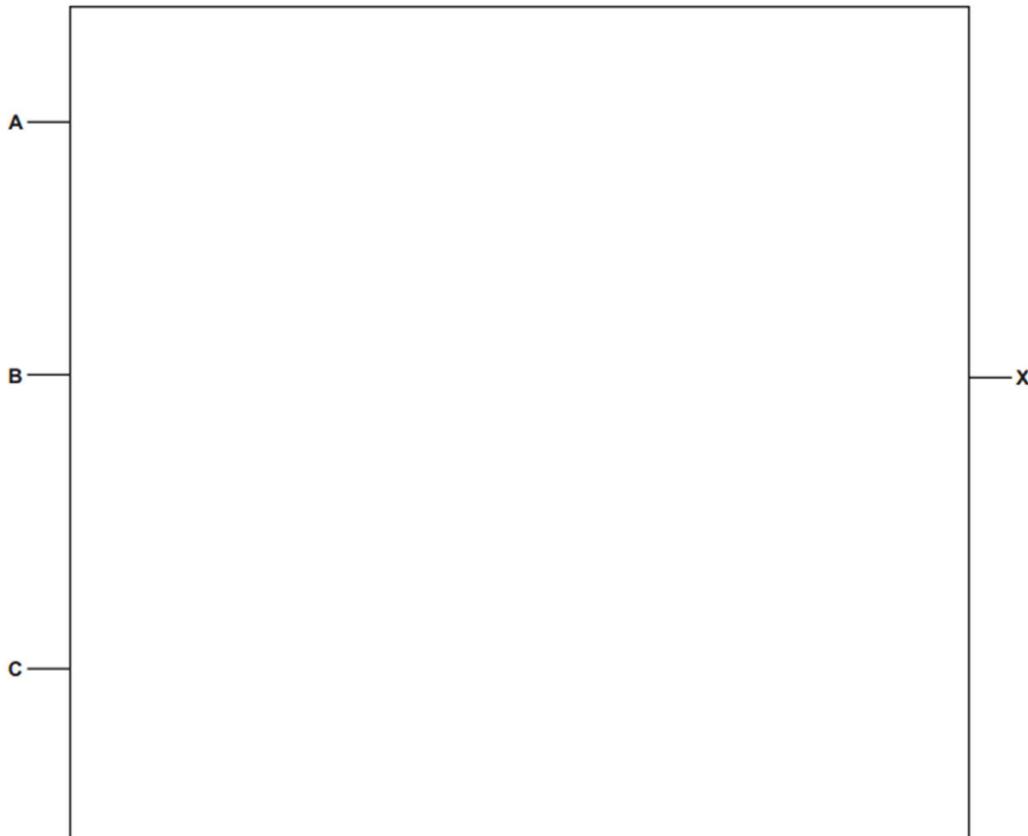
[2]

11 Consider the following logic statement:

$$X = (((A \text{ AND } B) \text{ OR } (\text{NOT } (B \text{ OR } C))) \text{ NAND } C)$$

- (a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the logic statement. All logic gates must have a maximum of **two** inputs.



[5]

- (b) Complete the truth table for the given logic statement.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

- (c) Identify **two** logic gates that are **not** included in the given logic statement.

Logic gate 1

Logic gate 2

[2]

..

- (c) Complete the truth table for the given logic statement.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

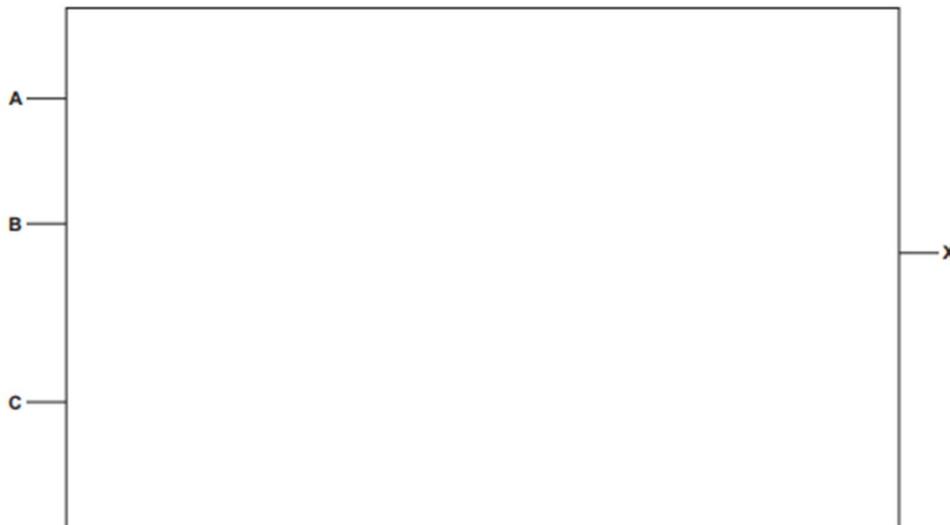
[4]

8 Consider the following logic statement:

$$X = (((A \text{ OR } B) \text{ AND } (\text{NOT}(B \text{ XOR } C))) \text{ OR } \text{NOT } C)$$

(a) Draw a logic circuit to represent the given logic statement.

Do **not** attempt to simplify the logic statement. All logic gates must have a maximum of **two** inputs.



[6]

(b) Complete the truth table for the given logic statement.

A	B	C	Working space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

- 5 A database table, APPLIANCE, is used to keep a record of kitchen appliances available for sale.

The following data is stored for each appliance:

- CATEGORY – washer, dishwasher, fridge or freezer
- ECONOMYRATING – A, B, C or D
- MANUFACTURER – Baku or ABC
- PRICE – price in \$
- CODE – a unique code allocated by the manufacturer e.g. B982
- STOCK – number in stock.

The database management system uses these data types:

Text Number Currency Boolean

The ECONOMYRATING field and MANUFACTURER field have a data type of text.

- (a) Identify the most appropriate data type for each field from the **four** types shown. State the reason why you chose each data type.

CATEGORY data type

Reason

PRICE data type

Reason

CODE data type

Reason

STOCK data type

Reason

[4]

- 10** A database table called TVRange shows the main features and prices of a range of televisions.

TVCode	ScreenSize	Satellite	SmartTV	SoundBar	Price\$
TV90SaSmSd	90	YES	YES	YES	9750.00
TV75SaSmSd	75	YES	YES	YES	8500.00
TV75SaSd	75	YES	NO	YES	8000.00
TV65SaSmSd	65	YES	YES	YES	6000.00
TV65SmSd	65	NO	YES	YES	5000.00
TV65SaSd	65	YES	NO	YES	5000.00
TV55SaSmSd	55	YES	YES	YES	4000.00
TV55SaSd	55	YES	NO	YES	3500.00
TV55SmSd	55	NO	YES	YES	3500.00
TV50SaSmSd	50	YES	YES	YES	2500.00
TV50Sa	50	YES	NO	NO	1750.00
TV50Sm	50	NO	YES	NO	1750.00
TV40Sa	40	YES	NO	NO	1200.00
TV40	40	NO	NO	NO	950.00
TV32	32	NO	NO	NO	650.00

- (a)** Give the name of the field that is most suitable to be the primary key.

State the reason for this choice.

Field

Reason

..... [2]

- (b) The database uses the data types:

- text
- character
- Boolean
- integer
- real
- date/time.

Complete the table to show the most appropriate data type for each field.
Each data type must be different.

Field	Data type
TVCode	
ScreenSize	
SmartTV	
Price\$	

[2]

- (c) Complete the structured query language (SQL) query to return the television (TV) code, screen size and price of all Smart TVs in the database table.

```
SELECT TVCode, ..... , .....  
..... TVRange  
WHERE SmartTV = .....;
```

[4]

10

- 10 A music streaming service has a new database table named `Songs` to store details of songs available for streaming. The table contains the fields:

- `SongNumber` – the catalogue number, for example AG123
- `Title` – the title of the song
- `Author` – the name of the song writer(s)
- `Singer` – the name of the singer(s)
- `Genre` – the type of music, for example rock
- `Minutes` – the length of the song in minutes, for example 3.75
- `Recorded` – the date the song was recorded.

- (a) Identify the field that will be the most appropriate primary key for this table.

..... [1]

- (b) Complete the table to identify the most appropriate data type for the fields in `Songs`

Field	Data type
<code>SongNumber</code>	
<code>Title</code>	
<code>Recorded</code>	
<code>Minutes</code>	

[2]

- (c) Explain the purpose of the structured query language (SQL) statements.

`SUM (Minutes) FROM Songs WHERE Genre = "rock";`

`COUNT (Title) FROM Songs WHERE Genre = "rock";`

- 10** A database table called `Sitel` stores details of some holiday homes at a holiday park. The database shows the type of home, number of guests, whether it is privately owned and the weekly rate to hire it.

Name	Type	Private	Rate\$	NumberGuest
Bay Lodge	Lodge	NO	1000	10
Bay View	Cabin	NO	400	4
Blue Skies	Cabin	NO	350	4
Cliff View	Cabin	NO	650	6
Coppice Lodge	Lodge	NO	1200	12
Green Lodge	Lodge	NO	1000	8
Henry	Cabin	YES	300	2
Hikers' Rest	Retreat	NO	750	6
Poppy	Cabin	NO	300	2
Summer Joy	Retreat	YES	750	6
Valley View	Cabin	NO	600	6
West Lodge	Lodge	YES	1200	12

- (a)** State the number of fields and the number of records in this database table.

Fields

Records

[2]

- (b)** Describe the purpose of a primary key.

.....
..... [1]

- (c) The database uses the data types:
- alphanumeric
 - character
 - Boolean
 - integer
 - real
 - date/time.

Complete the table to show the most appropriate data type for each field.

Field	Data type
Type	
Private	
Rate\$	
NumberGuest	

[2]

- (d) Give the output that would be produced by the structured query language (SQL) statement:

```
SELECT Name, NumberGuest, Rate$  
FROM Site1  
WHERE NumberGuest >= 10;
```

.....
.....

Question	Answer	Marks
1(a)	- Base-2	1
1(b)	- 9 - 16 - 40 - 161	4

Question	Answer	Marks
4(a)	<p>Two marks for any two correct workings and one mark for the correct answer.</p> <p>Working:</p> <ul style="list-style-type: none"> - $100 \times 50 = 5000$ bits - $5000 \times 8 = 40,000$ bits - $40,000 / 8 = 5,000$ bytes - $5,000 \times 10 = 50,000$ bytes - $50,000 / 1024$ <p>Answer: 48.83 kB // 49 kB</p> <p>NOTE: Alternative correct methods of working can be credited. Answer can be given to any number of dp.</p>	3
4(b)	<p>One mark per correct method, two marks per justification.</p> <ul style="list-style-type: none"> - Lossless - Lossy would remove data permanently // lossless would not remove any data permanently // File could be restored to original ... - ... that could affect the quality (lossy) // ... to maintain the quality (lossless) 	3

Question	Answer	Marks
10(a)	<p>One mark per each correct logic gate with the correct input(s).</p>	5
10(b)	<p>One mark per logic gate name and one mark per correct drawing.</p> <ul style="list-style-type: none"> - NAND <ul style="list-style-type: none"> - NOR 	2

Question	Answer					Marks
10(c)	A	B	C	Working space	X	4
	0	0	0		0	
	0	0	1		0	
	0	1	0		0	
	0	1	1		1	
	1	0	0		0	
	1	0	1		1	
	1	1	0		0	
	1	1	1		1	
<p>4 marks per 8 correct outputs 3 marks per 6/7 correct outputs 2 marks per 4/5 correct outputs 1 mark per 2/3 correct outputs</p>						

0478/12

Cambridge IGCSE – Mark Scheme
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October/November 2021

Question	Answer	Marks
1(a)	– Base-10	1
1(b)	– 5 – 32 – 26 – 171	4
1(c)(i)	– 00100101	1
1(c)(ii)	– 00011011	1
1(d)(i)	Any one from: – To represent HTML colour codes – In error messages	1
1(d)(ii)	Any one from: – Assembly code/language – Memory address locations – In error messages – Memory dump	1

5(b)(i)	Any three from: – A compression algorithm is used – The resolution could be reduced – Colour depth could be reduced // bits per pixel reduced – Sounds not heard by human ear could be removed // Perceptual music shaping can be used – Repeating frames could be removed	3
5(b)(ii)	Any one from: – Quality may be reduced – Data is lost // original file cannot be reconstructed	1
5(c)(i)	Any one from: – Maintains quality // quality better than lossy – Original file is retained // Data is not permanently lost – A significant reduction in file size is not required	1

Question	Answer	Marks
11(a)	<p>One mark per each correct logic gate with correct input(s)</p>	5

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Question	Answer					Marks																																													
11(b)	<p>4 marks for 8 correct outputs 3 marks for 6/7 correct outputs 2 marks for 4/5 correct outputs 1 mark for 2/3 correct outputs</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>Working space</th> <th>X</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td></td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td></td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td></td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td></td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td></td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td></td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td></td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td></td><td>0</td></tr> </tbody> </table>					A	B	C	Working space	X	0	0	0		1	0	0	1		1	0	1	0		1	0	1	1		1	1	0	0		1	1	0	1		1	1	1	0		1	1	1	1		0	4
A	B	C	Working space	X																																															
0	0	0		1																																															
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11(c)	<ul style="list-style-type: none"> - NOR - XOR / EOR 					2																																													

Question	Answer	Marks																																													
8(a)	<p>One mark per each correct logic gate with correct inputs</p>	6																																													
8(b)	<p>4 marks for 8 correct outputs 3 marks for 6/7 correct outputs 2 marks for 4/5 correct outputs 1 mark for 2/3 correct outputs</p> <table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> <th>Working space</th> <th>X</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td></td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td></td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td></td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td></td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td></td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td></td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td></td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td></td><td>1</td></tr> </tbody> </table>	A	B	C	Working space	X	0	0	0		1	0	0	1		0	0	1	0		1	0	1	1		1	1	0	0		1	1	0	1		0	1	1	0		1	1	1	1		1	4
A	B	C	Working space	X																																											
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1	1	0		1																																											
1	1	1		1																																											
Question	Answer	Marks																																													
5(a)	CATEGORY – Text characters / words only used PRICE – Currency, the price is in dollars / money CODE – Text no calculations required, could be numbers or characters STOCK – Number, comparisons and calculations may be required	4																																													
Question	Answer	Marks																																													
10(a)	<p>One mark for the correct field name One mark for the correct reason</p> <p>For example:</p> <p>TVCode Each entry in this field is a unique identifier</p>	2																																													

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Question	Answer	Marks										
10(b)	<p>Two marks for four correct answers. One mark for two or three correct answers.</p> <table border="1"> <thead> <tr> <th>Field</th> <th>Data type</th> </tr> </thead> <tbody> <tr> <td>TVCode</td> <td>Text</td> </tr> <tr> <td>ScreenSize</td> <td>Integer</td> </tr> <tr> <td>SmartTV</td> <td>Boolean</td> </tr> <tr> <td>Price\$</td> <td>Real</td> </tr> </tbody> </table>	Field	Data type	TVCode	Text	ScreenSize	Integer	SmartTV	Boolean	Price\$	Real	2
Field	Data type											
TVCode	Text											
ScreenSize	Integer											
SmartTV	Boolean											
Price\$	Real											
10(c)	<p>One mark for each correct answer</p> <p>ScreenSize Price\$ FROM YES</p> <p>Correct code:</p> <pre>SELECT TVCode, ScreenSize, Price\$ FROM TVRange WHERE SmartTV = YES;</pre>	4										

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Question	Answer	Marks										
10(a)	SongNumber	1										
10(b)	One mark for every two correct data types	2										
	<table border="1"> <thead> <tr> <th>Field</th> <th>Data Type</th> </tr> </thead> <tbody> <tr> <td>SongNumber</td> <td>Text/Alphanumeric</td> </tr> <tr> <td>Title</td> <td>Text/Alphanumeric</td> </tr> <tr> <td>Recorded</td> <td>Date/time</td> </tr> <tr> <td>Minutes</td> <td>Real</td> </tr> </tbody> </table>	Field	Data Type	SongNumber	Text/Alphanumeric	Title	Text/Alphanumeric	Recorded	Date/time	Minutes	Real	
Field	Data Type											
SongNumber	Text/Alphanumeric											
Title	Text/Alphanumeric											
Recorded	Date/time											
Minutes	Real											
10(c)	<p>One mark for each point</p> <ul style="list-style-type: none"> • to find the total number of minutes of music • to find the total number of songs • available for the genre rock 	3										

Question	Answer	Marks
10(a)	One mark for each correct answer Fields 5 Records 12	2
10(b)	to uniquely identify a record	1

Question	Answer	Marks										
10(c)	Two marks for four correct answers. One mark for two or three correct answers. <table border="1"> <thead> <tr> <th>Field</th> <th>Data type</th> </tr> </thead> <tbody> <tr> <td>Type</td> <td>Alphanumeric</td> </tr> <tr> <td>Private</td> <td>Boolean</td> </tr> <tr> <td>Rate\$</td> <td>Integer</td> </tr> <tr> <td>NumberGuest</td> <td>Integer</td> </tr> </tbody> </table>	Field	Data type	Type	Alphanumeric	Private	Boolean	Rate\$	Integer	NumberGuest	Integer	2
Field	Data type											
Type	Alphanumeric											
Private	Boolean											
Rate\$	Integer											
NumberGuest	Integer											
10(d)	One mark per mark point, max three <ul style="list-style-type: none"> • data correctly extracted in any two rows • data correctly extracted in third row • data in correct order horizontally and vertically Example answer: Bay Lodge 10 1000 Coppice Lodge 12 1200 West Lodge 12 1200	3										



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