This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners’ meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.
Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 1:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks must be awarded in line with:</td>
</tr>
<tr>
<td>• the specific content of the mark scheme or the generic level descriptors for the question</td>
</tr>
<tr>
<td>• the specific skills defined in the mark scheme or in the generic level descriptors for the question</td>
</tr>
<tr>
<td>• the standard of response required by a candidate as exemplified by the standardisation scripts.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks awarded are always <strong>whole marks</strong> (not half marks, or other fractions).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks must be awarded <strong>positively:</strong></td>
</tr>
<tr>
<td>• marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate</td>
</tr>
<tr>
<td>• marks are awarded when candidates clearly demonstrate what they know and can do</td>
</tr>
<tr>
<td>• marks are not deducted for errors</td>
</tr>
<tr>
<td>• marks are not deducted for omissions</td>
</tr>
<tr>
<td>• answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 4:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 5:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENERIC MARKING PRINCIPLE 6:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.</td>
</tr>
</tbody>
</table>
History of Tawara Mining

Tawara is best known today for its tourism, fishing and farming but there was a time when it was known all around the world for its mining industry. Mining is known to have started in the Bronze Age and continued until its demise with the closure of the last tin mine in 1998. In the 18th and 19th centuries Tawara was one of the richest mining economies in the world. Industries, inventions and communities were built on its wealth of underground treasures. The abundance of metals in the Celtic soil has been suggested as a possible reason why the Romans invaded.

**Tawara Mining**

The first part of the 19th century was the peak for mining in this area with most of the world's copper being mined here. The largest, deepest and oldest mine in the world was located here until its closure in 1921. It was once referred to as the richest square mile on earth and was known as the 'Queen of Mines'. The late 1890s also saw the emergence of South Crofty and it became well established as a future leader of the industry. The main metals that it produced were tin, copper, lead and zinc.

The mining process consisted of a shaft sunk into the ground from which tunnels or drives would be blasted from the rock to reach the seams that contained the ore at various levels. From the drives, vertical tunnels or raises were created to join the drives and the rock between them was blasted out from a stope which contained the sought after metals. To separate the valuable ore from the rock the broken rock was taken from the mine to the processing mill where various extraction methods were used to access the metals.

**Dangers**

Any job working below the ground is potentially hazardous and mining was no exception. Conditions were hot, oppressive and very dangerous but miners were prepared to work beyond their means to earn a living. Conditions were hot, damp and very dangerous. To work beyond their means to earn a living. Conditions were hot, damp and very dangerous. Miners were prone to many different diseases. Bronchitis, silicosis, TB and rheumatism were all common complaints making life expectancy short and few miners were fit to work beyond the age of 40. A very common injury was vibration white finger which affected rock drillers whose work involved extended use of vibrating hand-held machinery.

In the early days there were no cages to haul miners up and down the shaft. Mines were reached by ladders which could stretch down for 100 feet. Not surprisingly, falls were commonplace. Rock falls and flooding were hazards faced by miners on a daily basis and accidents were a frequent occurrence. In the 18th and 19th centuries, it was common place for children to be employed in the mines.

**Demise of Mining**

In 1893 there were 67 mines in the area producing tin but by 1897 only 31 were still in production. Discoveries of massive mineral deposits in the New World caused many people to pack up and leave in search of work. Thousands of miners migrated overseas where their mining expertise was much valued in the new world of Australia, South Africa, North America and even Peru.

Several minor revivals took place over the following century, but the mining industry never fully recovered and became completely unprofitable as it could not compete with mining expansion around the world. Metal prices fell dramatically during the 1980s and this finally resulted in the
collapse of mining at Tawara on an industrial scale. The last working tin mine in Europe closed in 1998.

**World Mining**

Today the world’s top 5 mining countries are:

- Russia – iron, nickel, coal and cobalt
- South Africa – gold, copper and iron
- USA – copper, coal
- Australia – iron, nickel and bauxite
- China – gold, iron, bauxite, copper

**Tin Mining**

Tin is one of the oldest metals known to man. It is thought that tin has been traded throughout Europe for around 4,000 years and was of huge strategic importance to rulers and traders. It was alloyed with copper to make bronze for utensils, weapons and decorations in a material that was far superior to stone.

Tin revolutionised the food industry as tin-plated iron, and then steel, cans enabled food to be preserved and transported. Tin foil was once a common wrapping material for foods and drugs but since the early 20th century most everyday materials such as beverage cans and tin foil are actually made of steel or aluminium. From toothpaste to window glass to wiring, tin remains an important material in our world. Major tin deposits are confined to a comparatively small number of areas with tin production dominated by China and Indonesia, which account for over 70% of global mine output.

The largest operating mine currently in Europe is the Neves-Corvo complex in Portugal where both tin and copper are extracted.

**The Future**

Over recent times the price of tin in particular has been soaring again due to limited reserves found around the world. Current metal prices are as follows:

<table>
<thead>
<tr>
<th>BASE METAL PRICE USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal name</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Aluminium</td>
</tr>
<tr>
<td>Copper</td>
</tr>
<tr>
<td>Lead</td>
</tr>
<tr>
<td>Nickel</td>
</tr>
<tr>
<td>Tin</td>
</tr>
<tr>
<td>Zinc</td>
</tr>
</tbody>
</table>

The future of metal are still found in Tawara granite and over the coming years the price is expected to double. Demand has also increased due to tin being required for solder in the electronic and computer markets. Improvements in mining technology mean that the cost of extraction has fallen dramatically. Safety and environment regulations have all improved. This makes the prospect of tin mining an attractive proposition and the future for the mining industry has never been brighter.

**Tawara Heritage Mining**

We are introducing a limited edition range of commemorative bullion ingots to celebrate the rich history of the mining industry. We are offering valued members the opportunity of purchasing commemorative ingots of Tin (silvery/grey in appearance), Copper (reddish/orange in appearance), Lead (silvery/blue in appearance) and Zinc (bluish/white in appearance). Each ingot weighs one kilogram and is branded with the Tawara hallmark. All have been sourced from Tawara ore production and are 99.9% pure.
## Card payments in 2017

<table>
<thead>
<tr>
<th>Cust_No</th>
<th>Title</th>
<th>First_Name</th>
<th>Last_Name</th>
<th>Order_ID</th>
<th>Order_Value</th>
<th>Gross_Value</th>
<th>Pay_Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>THM0053</td>
<td>Mr</td>
<td>Freddie</td>
<td>Greenwood</td>
<td>T183</td>
<td>€90</td>
<td>€108</td>
<td>Paycardo Wallet</td>
</tr>
<tr>
<td>THM0021</td>
<td>Mr</td>
<td>Aaron</td>
<td>Bentley</td>
<td>T144</td>
<td>€90</td>
<td>€108</td>
<td>Paycardo Wallet</td>
</tr>
<tr>
<td>THM0031</td>
<td>Mr</td>
<td>Eric</td>
<td>Bailey</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THM0084</td>
<td>Miss</td>
<td>Francesca</td>
<td>Brooks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>THM0036</td>
<td>Mr</td>
<td>Lewis</td>
<td>Bates</td>
<td>T174</td>
<td>€120</td>
<td>€144</td>
<td>Debit Card</td>
</tr>
<tr>
<td>THM0071</td>
<td>Mr</td>
<td>Alex</td>
<td>Fisher</td>
<td>T188</td>
<td>€120</td>
<td>€144</td>
<td>Debit Card</td>
</tr>
<tr>
<td>THM0006</td>
<td>Mr</td>
<td>Gabriel</td>
<td>Bryan</td>
<td>T160</td>
<td>€135</td>
<td>€162</td>
<td>Debit Card</td>
</tr>
<tr>
<td>THM0090</td>
<td>Miss</td>
<td>Matilda</td>
<td>Craig</td>
<td>T195</td>
<td>€140</td>
<td>€168</td>
<td>Debit Card</td>
</tr>
<tr>
<td>THM0001</td>
<td>Mr</td>
<td>Luke</td>
<td>Kirby</td>
<td>T143</td>
<td>€90</td>
<td>€108</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0038</td>
<td>Mr</td>
<td>Patrick</td>
<td>Woodward</td>
<td>T145</td>
<td>€90</td>
<td>€108</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0083</td>
<td>Mr</td>
<td>Taylor</td>
<td>Hargreaves</td>
<td>T150</td>
<td>€90</td>
<td>€108</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0098</td>
<td>Mr</td>
<td>Henry</td>
<td>Dodd</td>
<td>T156</td>
<td>€91</td>
<td>€109</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0095</td>
<td>Mrs</td>
<td>Samantha</td>
<td>Walton</td>
<td>T40</td>
<td>€95</td>
<td>€114</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0088</td>
<td>Mrs</td>
<td>Lara</td>
<td>Riley</td>
<td>T153</td>
<td>€105</td>
<td>€114</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0051</td>
<td>Mr</td>
<td>Hayden</td>
<td>Parsons</td>
<td>T181</td>
<td>€120</td>
<td>€144</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0086</td>
<td>Ms</td>
<td>Emma</td>
<td>West</td>
<td>T152</td>
<td>€120</td>
<td>€144</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0086</td>
<td>Ms</td>
<td>Emma</td>
<td>West</td>
<td>T193</td>
<td>€120</td>
<td>€144</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0030</td>
<td>Mrs</td>
<td>Alice</td>
<td>Lamb</td>
<td>T171</td>
<td>€120</td>
<td>€144</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0001</td>
<td>Mr</td>
<td>Luke</td>
<td>Kirby</td>
<td>T1</td>
<td>€121</td>
<td>€145</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0005</td>
<td>Miss</td>
<td>Ellie</td>
<td>Morley</td>
<td>T159</td>
<td>€121</td>
<td>€145</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0009</td>
<td>Mrs</td>
<td>Jennifer</td>
<td>Welch</td>
<td>T161</td>
<td>€125</td>
<td>€150</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0096</td>
<td>Ms</td>
<td>Ellie</td>
<td>Jenkins</td>
<td>T155</td>
<td>€130</td>
<td>€156</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0009</td>
<td>Mrs</td>
<td>Jennifer</td>
<td>Welch</td>
<td>T198</td>
<td>€130</td>
<td>€156</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0100</td>
<td>Mrs</td>
<td>Isabel</td>
<td>Price</td>
<td>T162</td>
<td>€131</td>
<td>€157</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0091</td>
<td>Ms</td>
<td>Gracie</td>
<td>Stokes</td>
<td>T196</td>
<td>€135</td>
<td>€162</td>
<td>Credit Card</td>
</tr>
<tr>
<td>THM0044</td>
<td>Mrs</td>
<td>Samantha</td>
<td>Bowen</td>
<td>T201</td>
<td>€160</td>
<td>€192</td>
<td>Credit Card</td>
</tr>
</tbody>
</table>

**Select records (28):**
- Pay_Type contains card
- Order_Year is 2017, Order_Value is 90 or more

**Calculated field**
- Heading 100% accurate
- Order_Value plus 20%

**Average order value**
- €114

**Order_Value, Gross_Value, Average Value** same currency symbol, 0dp
- Sort descending Pay_Type, ascending Order_Value no grouping
- Specified base fields in correct order
- Landscape, one page wide, all base fields present and fully visible
- Label to left of calculation, 100% accurate
- Record THM0044 inserted as new record – THM0001 (T143/T1) not replaced

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Select records (7)
Memb_Type is Adult or Family 1 mark
Memb_Date is <01/01/2015, Tin is >=3 1 mark
Sort ascending on Last_Name 1 mark

Layout:
Labels in 2 columns, 8 labels to page 1 mark
Heading VIP Invitation! top of every label, centred, bold, larger font size 1 mark
Fields on separate lines, correct position, space to separate:
Title First_Name Last_Name 1 mark
Add1 1 mark
Town Postcode 1 mark
Memb_Date 1 mark
Tin 1 mark
Name, Centre number and candidate number bottom of every label 1 mark
MAIL MERGE

Name, Centre Number, Candidate number

Tawara Heritage Mining

Twelve Heads
St Way
TR2 3WW
Tel: 020 7046 0158
Email: TMH@tawaraminer.com

09-Aug-16

«Title» «First_Name» «Last_Name»
«Add1»
«Town»
«County»
«PostCode»

Dear «First_Name»

We are pleased to announce that Tawara Heritage Mining will be opening its doors to the public for the first time on 10th August 2016.

As an early bird privilege, all visitors will receive a branded commemorative «Reward» which tells the fascinating story of Tawara mining.

In recognition of your continued loyalty all VIP visitors will receive a gift of a branded commemorative «Reward» coin. You will also be given the opportunity of purchasing a limited edition commemorative gold or silver bullion ingot. All the coins and ingots have been mined on site and are branded with the Tawara hallmark. They will only be available for purchase on the day and are sure to become collector items.

We look forward to welcoming you at the Tawara Heritage Mining open day.

Yours sincerely

Joe Bloggs
Tawara Heritage Mining

Image reflected 1 mark

Merge Fields inserted – placeholders and <> correctly replaced
«Title» «First_Name» «Last_Name» | «Add1» | «Town» | «County» | «Postcode» correct position and space 1 mark
«First_Name» | «Status» | «Bonus» | «Reward» correct position and spacing 1 mark

Name replaces Candidate Name
Name, Centre number and candidate number in the header 1 mark
Result of merge – 3 letters printed – Alex Lord, Victoria Griffiths, Anka Ploski only 1 mark
Task 5 – Presentation

5 slides imported, title and bullet layout no blank slides, no text changed, no overlap 1 mark

Master slide (items appear on all slides, same position and size):
- Logo appears top right, resized with aspect ratio maintained, same position/size on all slides 1 mark
- Name, Centre and candidate numbers bottom left, automatic slide numbers top left, same position/size on all slides 1 mark

Base Metal Mining
- Around the world

Copper Mining
- Escondida in Chile is the largest copper mine in the world
- Opened in 1988 it ranks as the third deepest open-pit operation
- Size - 3.9 kms long, 2.7 kms wide, 645 metres deep
- Output in 2013 was 1.1 million tonnes (Mt)
- Reserve life estimated to be 54 years
- Chile hosts six of the 10 largest copper mines in the world

Zinc Mining
- Rampura Agucha in India is the largest zinc mine in the world
- Output in 2013 was 640,845 million tonnes
- Total reserves and resources are 100 million tonnes
- More than 50 countries around the world mine zinc ore
- About 80% of the world's zinc is mined underground

Iron Ore Mining
- The largest iron mine in the world is Kiruna in Lapland
- Annual iron ore production capacity of over 26 million tonnes
- Reserves of 600 million tonnes
- Size - 4 kms (2.5 miles) long, depth of up to 2 kms (1.2 miles)

Tin Mining
- Tin mining is dominated by China and Indonesia
- Accounts for over 70% of global mine output
- Estimates that the mineable tin on Earth will be gone in 20 to 40 years
- Price of tin rapidly rising over the past 10 years
Pie chart created, correct data for top 5 countries only 1 mark
Chart title **Top 5 Tin Mining Countries** 1 mark
Countries and values only on segments, no legend 1 mark
Largest segment pulled away from chart 1 mark
Chart positioned to left of bullets on **Tin Mining** slide 1 mark
Print 6 slides to page and **Tin Mining** as single, full page slide 1 mark
Evidence Document

Step 1 – EVIDENCE 1 – File saved as MINING and evidence of file type

File saved as MINING correct file type 1 mark

Step 4 – EVIDENCE 2 – THM-Subhead style definition screen shot here:

THM-Subhead
THM-Subhead style created and named correctly 1 mark
Sans-serif, 16pt, italic, underlined 1 mark
Centre aligned, single line, 0pt space before, 6pt after (no other spacing set) 1 mark

Step 5 – EVIDENCE 3 – Style list – styles correctly created, named and saved

Style list
At least 1 THM style other than THM-Subhead listed 1 mark
Step 22 - EVIDENCE 4 – Database field structure screen shot here:

![Database structure screenshot]

**DB Structure**
- 10 Field names as given, correct data types, Cust_No set as primary key 1 mark

Step 23 - EVIDENCE 5 – Relationship between the two tables screen shot here:

![Relationship screenshot]

**OR**

1 to Many relationship between Cust_No and Cust_ID fields 1 mark

Step 25 - EVIDENCE 6 – Form

![Order form screenshot]

**Form**
- Columnar form created, all (8) fields from orders table, field headings left aligned, all data fully visible 1 mark
- Appropriate title in the form header 1 mark
- Form used to add new record – 100% accurate 1 mark

Step 26 – EVIDENCE 7 – Calculated average formulae screen shot here:

![Database formula screenshot]

Database formula for calculated Average 1 mark

Step 27 – EVIDENCE 8 – extract exported

![Report screenshot]

Report exported as text file with evidence of file type 1 mark
Step 29 – EVIDENCE 9 – AO1

*The Customers table contains a primary key. Explain why the Last_Name field would not be appropriate as a primary key:*

(a) data not unique/people may have the same last name 1 mark

*When adding data to a field in the Customers table, it would be easier for a user to select data from a list.*

(b) Speeds up data entry/reduces data entry errors 1 mark

*Identify another advantage of selecting data from a list:*

(c) Two from: Pay_Type, Memb_Type, Title 2 marks

Step 30 – EVIDENCE 10 – date field screen shot here:

Evidence of field for today’s date, correct format dd-MMM-yy 1 mark

Step 34 – EVIDENCE 11 – Mail merge selection method screen shot here:

Mail Merge Evidence of automated filter to select Elite status 1 mark

Step 43 – EVIDENCE 12

Tawara are currently backing up their data onto a tape drive system. They are considering backing up onto the cloud.

*Evaluate in your own words the use of the cloud to back up data compared to their tape drive system. Recommend the most appropriate back up storage for Tawara Heritage Mining to use.*

This is a comparison question (responses must include both cloud versus tape)

**Benefits of cloud**
- access to files and data anywhere at any time vs access to tape physical location
- reduced hardware/software costs as there is no hardware
- only pay for the storage you use, on a tape system you have to buy a brand new tape
- more fault tolerance – greater chances of recovering data from raided/mirror cloud storage
- access to data on cloud is faster than tape as tape may need to come from off-site store/direct access to storage within the cloud vs sequential access on tape
- storage capacity may be unlimited on the cloud vs capacity of storage limited on tape

**Drawbacks of cloud**
- concerns over security of data/multiple copies, don’t know where data is stored, tape systems are more secure
- ownership of data, data on tapes is fully owned by you
- need internet access to update/access files, tapes you don't/data restrictions through ISP
- pay monthly subscription to cloud storage provider/ongoing cost [max 3 marks]

Recommendation [1 mark]