Cambridge Assessment International Education

# Cambridge IGCSE™

**GEOGRAPHY** **0460/41**

Paper 4 Alternative to Coursework **May/June 2023**

MARK SCHEME

Maximum Mark: 60

**Published**

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.

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**[Turn over**

## 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.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- 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
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- 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.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g., in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

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).

GENERIC MARKING PRINCIPLE 6:

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.

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| Question | Answer | Marks |
|---|---|---|
| 1(a)(i) | It is a manufacturing industry. | **1** |
| 1(a)(ii) | Input: limestone / red alluvium / shale / gypsum / electricity / labour.<br>Process: crushing / milling/ burning / grinding / bagging. | **2** |
| 1(b)(i) | Systematic sampling – 1 mark reserve.<br>Ask every nth / tenth person / regular pattern (minimum 3);<br>Avoid bias / fair test / quick method / reliable;<br>**OR**<br>Random sampling – 1 mark reserve.<br>Use random numbers to identify people / ask next person they meet / no system to choose;<br>Random numbers avoid bias / quick method / fair test / reliable / equal chance of anyone being chosen;<br>**OR**<br>Stratified sampling – 1 mark reserve.<br>Ask appropriate age group / gender (in local population);<br>Avoids bias / fair test / reliable / representative sample. | **3** |
| 1(b)(ii) | Scale of 1 – 5 / people give a score out of 5 / number scale;<br>1 shows little concern & 5 shows high level of concern. | **2** |
| 1(b)(iii) | Plot dangerous traffic = 294. | **1** |
| 1(b)(iv) | Plot for 21 – 40 age group.<br>looks ugly = 2.8.<br>trees are chopped down = 1.7. | **2** |

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>1(b)(v)</td><td>Credit 2 marks for statements:<br><br>Results / average score from <u>different / all age groups / overall</u> are similar / similar order /similar rank order;<br><br><u>Most</u> scores / scores from <u>most</u> age groups / scores from 3 out of 4 groups are highest for air pollution / noise;<br>OR<br>Scores for air pollution / noise are high for all age groups;<br>OR<br>More people / age groups concerned about air pollution / noise;<br><br><u>Most</u> scores / scores from <u>most</u> age groups / scores from 3 out of 4 groups are lowest for looks ugly / trees chopped down;<br>OR<br>Scores for trees chopped down / looks ugly are low for all age groups;<br>OR<br>Less people / age groups concerned about trees chopped down / looks ugly;<br><br>Credit 1 mark for data (does not need to support a statement) e.g.<br>3 out of 4 groups score air pollution at 4.4, 4.0 and 4.4 / 4.0 and over;<br>Air pollution scores between 3.9 – 4.4 / above 3.8.<br><br>Credit variation in scores or average scores:<br><table><tr><td></td><td>variation</td><td>average</td></tr><tr><td>air pollution</td><td>0.5</td><td>4.2</td></tr><tr><td>noise</td><td>0.5</td><td>3.8</td></tr><tr><td>traffic</td><td>0.8</td><td>3.0</td></tr><tr><td>looks ugly</td><td>1.0</td><td>2.1</td></tr><tr><td>trees</td><td>1.4</td><td>1.75</td></tr></table></td><td>3</td></tr>
<tr><td>1(b)(vi)</td><td>Ideas such as:<br><br><u>Where they live:</u> people who live near factory (are more concerned);<br><u>Where they work:</u> their income supports the family / not want to lose their job so will be less concerned;<br><u>People with:</u> breathing difficulties / illness such as bronchitis / asthma / eye infection / cannot afford treatment (will be more concerned);<br><u>Views of environment:</u> want to preserve nature / conservationists / care about the environment (will be more concerned);<br><u>How they get to work OR do they drive:</u> drivers must drive on damaged road / traffic congestion (will be more concerned);<br><u>Family with children:</u> children are disturbed by the noise / difficult to concentrate at school / danger on road (will be more concerned);<br><u>People who produce food:</u> land is infertile / less yield (will be more concerned).</td><td>3</td></tr>
</table>

| Question | Answer | Marks |
|---|---|---|
| 1(c)(i) | Pie graph completion:<br>Plot 'close down the factory' = 22 and 'build a clinic' = 29.<br><br>1 mark for dividing line at 71.<br>1 mark for shading.<br><br>**Note:** Credit 1 mark if wrong way around – line at 78 & correct shading. | **2** |
| 1(c)(ii) | Hypothesis is **false** – 1 mark reserve (✓HA).<br><br>The best / most supported / highest percentage chosen method is to make a law (to reduce the amount of air pollution);<br>**OR**<br>Close down the factory is not the best / not highest percentage / the third best / third most supported method / two other methods are more popular (or describing the methods);<br>**OR**<br>More people want to make a new law / build a clinic than close down the factory;<br><br>Reserve 1 mark for paired data:<br>Make a law to reduce the amount of air pollution = 35%, close the factory = 22% / 13% more. | **3** |

| Question | Answer | Marks |
|---|---|---|
| 1(c)(iii) | Make a law to reduce the amount of air pollution:<br><br>**Advantages**:<br>Factory owners must take action;<br>Can be fined if they don't obey the law;<br>Stops companies producing a lot of air pollution;<br>It will make the air cleaner / healthier to breathe;<br>Reduce the number of illnesses linked to breathing difficulties.<br><br>**Disadvantages**:<br>Factory owners may ignore the law;<br>Corruption / may bribe officials to ignore the law;<br>New machinery replaces workers.<br><br>Grants and loans to buy new machinery:<br>**Advantages**:<br>New machinery is more efficient / will reduce costs of production;<br>Will reduce the amount of air pollution / noise;<br>It will make the air cleaner / healthier to breathe;<br>Reduce the number of illnesses linked to breathing difficulties.<br><br>**Disadvantages**:<br>Grants and loans must be repaid / interest on loans;<br>Factory owners may not want to increase their costs.<br><br>Close down the factory:<br>**Advantages**:<br>It will remove the sources of air pollution / noise / amount of traffic / there will be less pollution;<br>It will make the air cleaner / healthier to breathe;<br>Reduce the number of illnesses linked to breathing difficulties / eye infections;<br>It will reduce traffic accidents / less danger from traffic.<br><br>**Disadvantages**:<br>People will lose their jobs / incomes / unemployment;<br>Difficult to get another job / may not have the skills needed for other employment;<br>Cannot support the family / buy food;<br>Factory suppliers suffer / negative multiplier;<br>Loss of production / no cement for local industry. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 1(c)(iii) | Build a clinic to treat breathing difficulties and eye diseases:<br>**Advantages:**<br>People can be treated for eye infection / breathing difficulties;<br>Doctors may treat other illnesses / diseases or e.g., / local residents' health will improve;<br>Will benefit the whole community;<br>Creates jobs for doctors.<br><br>**Disadvantages:**<br>Cost of building clinic / employing doctors;<br>Doctors may not be available / shortage of doctors;<br>People cannot afford treatment.<br><br>**Note:** Reserve 1 mark for advantages / disadvantages of chosen method. | |
| 1(d) | Do survey / fill in the form at different distances away from the factory / examples of varying distances;<br>Do the survey on the same day / in same conditions;<br>Complete distance away from factory on bi-polar sheet;<br>Decide on the score for each problem / rate the problem;<br>Mark score on form / tick the appropriate score;<br><br>**Note:** If answer is the questionnaire idea – still credit.<br>Mark score on form / tick the appropriate score. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 2(a) | Learn how to work safely in the river;<br>Practise fieldwork techniques. | **2** |
| 2(b)(i) | Callipers. | **1** |
| 2(b)(ii) | Complete histogram for site 3:<br>Plot 2 at 601-900, 10 at 901–1200, 4 at 1201–1500. | **2** |
| 2(b)(iii) | No pattern / correlation to average pebble size going downstream;<br><br>1 mark for statement about variation in pebble numbers e.g.,<br>More smaller pebbles / lower average size at site 1 than site 3;<br>More larger pebbles / higher average size at site 5 than site 1;<br>More 1201 – 1500mm pebbles at site 5 than site 1;<br><br>1 mark for data showing hypothesis is wrong e.g.,<br>Average size at site 1 = 633mm and at site 5 = 750mm / 117mm bigger at site 5 (credit any two sites which show an increase downstream);<br>2 pebbles at site 1 between 1201–1500mm & 4 pebbles at site 5 / 2 more at site 5. | **3** |
| 2(c)(i) | Pebbles crash into each other / attrition;<br>Pebbles crash into bed or banks / bounce along riverbed / abrasion / corrasion;<br>Corrosion / solution / dissolves pebbles;<br>Smaller pebbles are moved further downstream because they are lighter to transport / longer duration of transport / longer time to be eroded / been in river longer / downstream river has <u>less energy</u> to carry big pebbles. | **3** |
| 2(c)(ii) | <u>Measure 40 pebbles at each site;</u><br>Bigger sample so less effect of an anomaly;<br><u>More results</u> to calculate an average;<br><br><u>Two students individually measure the length of each pebble;</u><br><u>Check</u> the measurement;<br>Make sure mistakes are not made / less chance of making a mistake;<br>Make sure they get the same measurement. | **2** |
| 2(d)(i) | Use tape measure to measure certain distance / 10m (more than 5m) / measure between breaks of slope;<br>Students hold / put (ranging) poles at either end of measured distance / break of slope;<br>Put two (ranging) poles on riverbed;<br>Make sure poles are vertical;<br>Put string / rope <u>at same height</u> between poles;<br>Student holds clinometer next to top / at certain height on (ranging) pole;<br>Sight other ranging pole at top agreed height / same height on other pole / along string;<br>Student uses clinometer to measure angle / read off angle / read off Degrees. | **4** |

| Question | Answer | Marks |
|---|---|---|
| 2(d)(ii) | **Advantage:**<br>Give instant reading / faster / quicker;<br>Precise / accurate measurement or reading / exact figure;<br>Easy / clear to read / easy to measure / large digital readout / hard to read clinometer;<br>Don't need to know how to use a clinometer / don't have to read off clinometer;<br>Less chance of making mistake in reading / misreading;<br>Easy to carry / portable.<br><br>**Disadvantage:**<br>May not understand how to use the app;<br>May drop phone into river / phone is fragile / phone gets wet;<br>Phone may not be charged up / battery may run out;<br>Need to download app. | **2** |
| 2(d)(iii) | Circle measurement 18º at site 1.<br>Measurement is an anomaly / does not fit with other results / too big / <u>much</u> bigger than other measurements;<br>Remove the effect of the anomaly on the average / would affect the results;<br>Give a more reliable / accurate average results. | **2** |
| 2(d)(iv) | Plot average = 7º at site 4. | **1** |
| 2(d)(v) | Hypothesis is **true / generally true / mostly true / partially true** – 1 mark reserve (✓HA).<br><br>Credit 1 mark for paired **average** data from different sites e.g., 11º at site 1 or upstream and 5º at site 5 or downstream / 6º decrease between sites 1 and 5;<br>OR<br>Credit 1 mark for **range** of measurements from different sites e.g.,<br>at site 1 between 9 – 13º, at site 5 between 3 – 8º;<br><br>Credit 1 mark for identifying anomaly <u>at site 3 or 4.</u> | **3** |
| 2(e)(i) | Hypothesis such as:<br>Channel width increases downstream;<br>Does channel depth increase downstream;<br>River velocity increases downstream;<br>Does river velocity vary downstream.<br><br>Credit increase / decrease / vary / change.<br>**Note:** Must state 'downstream'. | **1** |

| Question | Answer | Marks |
|---|---|---|
| 2(e)(ii) | **Example 1 - method to measure channel width:**<br>One student / pole on each bank / side of river;<br>Place measuring tape across channel / from one bank to the other / measure distance between poles;<br>Keep tape taut / stretched;<br>Poles must be directly across/ at 90 degrees to banks;<br>Repeat method at all sites / 5 sites / each site.<br><br>**Example 2 – method to measure channel depth:**<br>Rest ruler on riverbed / lower rock on string to riverbed;<br>Make sure ruler is upright / vertical / make sure string is taut;<br>Measure depth at regular intervals across channel (every metre);<br>Read off the scale where water level reaches / where ruler is wet;<br>Repeat method at all sites / 5 sites / each site.<br><br>**Example 3 – method of measuring velocity using floats:**<br>Put poles / sticks 10 metres or fixed distance along river;<br>Use tape measure to measure distance;<br>Put float / orange in river at start of distance;<br>Start stopwatch / timer when float released at start point;<br>Measure time taken for float to travel between poles;<br>Stop stopwatch / timer when float passes end point;<br>Repeat method at points across the channel;<br>Repeat method at all sites / 5 sites / each site.<br><br>**Example 4 – method of measuring velocity using flowmeter:**<br>Put meter / propeller / flowmeter below surface of water / into water;<br>Propeller must face upstream;<br>No obstacles in front of propeller;<br>Read / look at digital reading / display to see speed;<br>Take several / repeat readings at points across the channel;<br>Repeat method at all sites / 5 sites / each site. | **4** |