Cambridge Assessment International Education

Cambridge O Level

GEOGRAPHY **2230/02**

Paper 2 Geographical Skills **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.

Cambridge International is publishing the mark schemes for the May/June 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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.

2230/02 (Geographical Skills) – Specific Marking Instructions

Examiners must use the following annotations:

Annotation	Meaning	Use
	Correct point	All questions
	Incorrect	All questions
	Reserve mark	All questions
	Just	All questions
	Omission or further development/detail needed to gain credit	All questions
	Unclear or validity is doubted	All questions
	Repetition	All questions
	Developed point	All questions
	Appropriate example	All questions
	Benefit of doubt	All questions
	Too vague	All questions

Annotation	Meaning	Use
IRRL	Irrelevant	All questions
NAQ	Material that does not answer the question	All questions
SEEN	1 Diagram has been seen but no specific credit given 2 Additional page has been checked	1 Any diagrams 2 All blank pages in the provided generic answer booklet and/or extension answer booklet(s).

Section A: Mapwork skills

Question	Answer	Marks	Guidance
1(a)(i)	**Give the four-figure grid reference for the grid square containing GUIBY PEAK located in the east of the map.** 9898	**1**	
1(a)(ii)	**What type of woodland is found in the grid square containing GUIBY PEAK?** Scrub	**1**	= 0 Scattered trees
1(a)(iii)	**Calculate the distance along the B76 HUGNIN ROAD from its start in grid square 9397 to the edge of the map in grid square 9395. Show your working.** 2.5 km (Reserve) 9.7–10.3 cm (on map) / 1.6 km + 0.9 km Use the linear scale from the map to measure against your piece of paper. 4 cm = 1 km / 10 cm ÷ 4	**2**	**Reserve 1 mark for 2.5 km** Must have km Allow 2.4–2.6 km = 0 You use a piece of paper and mark the start point. Then every time the road changes direction you mark it until you reach the end.
1(a)(iv)	**Identify <u>two</u> services in grid square 9797.** School Hospital District court Church Village hall Police station Marketing Board	**2**	Do not allow abbreviations: VH PS Sch Ch Hosp

Question	Answer	Marks	Guidance
1(b)(i)	**Use the map extract to identify the following shown on Fig. 1.1:** • **feature V** water tank • **the land use in area W** sugar plantation • **road X** motorway / M2 / Bell Village Phoenix Trunk Road	**3**	= 0 Water hole Well Spring Bridge
1(b)(ii)	**Describe the street pattern in area Y.** Grid (iron) / streets at right angles / straight / rectilinear / square	**1**	= 0 Linear In order Parallel
1(b)(iii)	**Give a six-figure grid reference for the trigonometrical station at Z.** 953982	**1**	Allow 954983
1(b)(iv)	**On Fig. 1.1, complete the route of the power line as shown in this area of the map extract.** Straight line (with ruler) from 945000 to meet power line at 947990	**1**	Must have v v v on line
1(b)(v)	**State the total area covered by the grid squares in Fig. 1.1. Give your answer in square kilometres (km^2).** 4 (km^2)	**1**	
1(c)(i)	**In which general compass direction is River Moka flowing?** West (from east to west)	**1**	= 0 North-west
1(c)(ii)	**Name one tributary of the Grand River North West.** Moka Cascade Perfonde Feeder Ory	**1**	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(d)</td><td><u>Using the map extract, complete Table 1.1</u> to compare the relief and drainage in grid squares 9599 and 9896.
<table>
<tr><th></th><th>grid square 9599
(near SÉNÈQUE PEAK)</th><th>grid square 9896
(near BEAU CLIMAT)</th></tr>
<tr><td>height</td><td>>200 m / lower

ranges from approx. 140/150 m to 280/290 m

higher range

shorter</td><td>>350 m / higher

ranges from around 350–370 m

lower range

taller</td></tr>
<tr><td>steepness of slope</td><td>very steep / steeper</td><td>gentle slopes / flatter</td></tr>
<tr><td>drainage (surface water)</td><td>water tanks / streams / less streams / less surface water</td><td>lots of streams / more streams / more surface water</td></tr>
</table></td><td>3</td><td>need units (m)

= 0
Flat

= 0
no rivers vs has rivers
none on SÉNÈQUE PEAK</td></tr>
<tr><td>1(e)</td><td>There is a sugar factory located in grid square 0097. Give <u>two</u> pieces of map evidence to show why this is a good location for a sugar factory.

Flat land / gentle slope
Large land
Near streams / water supply / reservoir / water tank
Near (main) road
Near sugar plantations / raw material
Near town / labour supply / market</td><td>2</td><td>Credit map evidence not explanation

= 0
Near resources
Cheaper land
Good transport</td></tr>
</table>

Section B: Geographical skills

Question	Answer	Marks	Guidance
2(a)(i)	**In which year between 2009 and 2020 was the GDP per person of Brunei highest?** 2012	1	
2(a)(ii)	**Describe the changes in the GDP per person of Brunei between 2009 and 2020.** Fluctuates <u>Overall</u> Slight decrease / similar from $28 000 to $27 500 <u>Rapid increase</u> 2009 to 2011/12 from $28 000 to $47 000 or $47 700 / by $19 000 / $19 700 <u>Slow increase</u> 2011 to 2012 <u>Rapid decrease</u> from 2012 to 2016 from $47 700 to $27 200 <u>(Slow / steady) increase</u> from 2016 to 2018 <u>Decrease</u> from 2018 to 2020 Highest 2012, lowest 2016	3	**Max. 1 mark for data** Allow ± $200 2009 = $28 000 2011 = $47 000 2012 = $47 700 2016 = $27 200 2018 = $31 600 2019 = $31 000 2020 = $27 500 Must be a change = 0 Lowest figure in 2016 ($27 200) Two peaks (2012 and 2018) Not stable
2(a)(iii)	**<u>On Fig. 2.1, plot the following data</u> for GDP per person of Brunei.** 1 mark for accurate plotting at $33 000 and $38 000 1 mark for neat line joining the points	2	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(b)(i)</td><td>Calculate the difference in GDP per person (US$) between Brunei and Indonesia.

27 000</td><td>1</td><td>= 0
Brunei higher</td></tr>
<tr><td>2(b)(ii)</td><td><u>Complete Table 2.2</u> to show the rank order of the top three ASEAN countries in 2019 as shown in Table 2.1.

<table>
<tr><th>rank order</th><th>GDP per person (US$)</th><th>GDP per person growth rate (%)</th></tr>
<tr><td>1</td><td>Singapore</td><td>Viet Nam</td></tr>
<tr><td>2</td><td>Brunei</td><td>Myanmar</td></tr>
<tr><td>3</td><td>Malaysia</td><td>Cambodia</td></tr>
</table></td><td>2</td><td>Do not credit <u>figures</u> for correct countries instead of country name as question asks for countries.</td></tr>
<tr><td>2(b)(iii)</td><td>Which country in Table 2.1 had a negative GDP per person growth rate in 2019?

Singapore</td><td>1</td><td></td></tr>
<tr><td>3(a)</td><td>Use Fig. 3.1 to describe the pattern of acid rain in the USA.

Any three valid points such as:

Lowest / less acidic in west
Lowest / less acidic <u>near</u> Canada / Mexico / between Canada and Mexico
Less acidic covers half of the USA
Highest / more acidic in north-east / east
Highest / more acidic <u>near</u> North Atlantic Ocean / <u>near</u> Great Lakes
Declines east to west
Declines north to south / more acidic in north than south <u>in eastern USA</u>
Moderately acidic <u>near</u> southern coast / <u>near</u> Gulf of Mexico / in southeast</td><td>3</td><td>= 0
Western coast
North Pacific Ocean
Reference to colours</td></tr>
</table>

Question	Answer	Marks	Guidance
3(b)	**Compare the emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) between 1995 and 2020.** Allow any valid comparison, such as: Both decrease between two dates Overall SO_2 by 93%, NO_x by 87% Overall SO_2 decreases > NO_x Overall SO_2 decreased by 6% more than NO_x = 2 marks (decrease = 1, data = 1) SO_2 fluctuates more than NO_x <u>1995 to 1997/8</u> Both increase <u>2002</u> SO_2 increases, NO_x decreases <u>2012</u> SO_2 and NO_x same % <u>1995–2012</u> SO_2 > NO_x <u>2012–2020</u> NO_x > SO_2 <u>1995 to 2012</u> NO_x decrease > SO_2 <u>2012 to 2020</u> SO_2 decrease > NO_x	**3**	**Must be a comparison** Allow dates within ranges given **Data max. 1 mark** Only credit overall data Allow ± 0.5% = 0 2012 NO_x overtakes SO_2 No double credit for same comparison in different years

Question	Answer	Marks	Guidance
3(c)(i)	**<u>Complete the graph on Fig. 3.3</u> to show that mayfly can survive in water with pH levels of 5.5.** 1 mark for neat shaded, accurate bar at pH 5.5	**1**	Same length bar as bass and crayfish = 0 Only 5.5 cell shaded Not shaded / diagonal lines / scribble etc.
3(c)(ii)	**Which aquatic organism can survive in the most acidic water?** Frogs	**1**	
3(d)	**Describe <u>two</u> ways that acid rain can be reduced.** Any two valid points to reduce SO_2 and NO_x emissions, such as: Use less fossil fuels Reduce emissions from fossil fuel power stations Conserve energy or e.g. turn off lights / use energy saving appliances / insulate homes Reduce vehicle use or e.g. car pool / use public transport / walk / bike / shop locally / phase out diesel/petrol cars / switch to electric cars Develop renewable energy or e.g. wind / wave / solar / geothermal Control industry emissions e.g. SO_2 scrubbers Say no to plastic Campaigns / international agreements Stop open burning / burning tyres (releases SO_2)	**2**	= 0 Any reference to CO_2 Reforestation

Section C: Geographical investigation

Question	Answer	Marks	Guidance
4(a)	**Suggest <u>two</u> things the students needed to consider when choosing their fieldwork sites.** Accessibility (from road / school) Obtain permission to cross land / enter the river Distance between sites / equal distance from each other / spread out / upstream and downstream / upper-middle-lower course / range of locations Away from human impact / weir / artificial levees / dam Strength of current / speed of flow Depth / width Weather forecast / risk of rainfall which could raise river levels Sharp rocks Stability of banks Dangerous animals Away from waterfalls / rapids	**2**	Accept: Safety / danger on its own (okay if no specific points) Avoid double credit = 0 Reference to number of groups

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4(b)(i)</td><td>Which <u>two</u> pieces of equipment would the students use to measure the width of the river channel? Tick (✓) the correct answers.

<table>
<tr><th>equipment</th><th>tick (✓)</th></tr>
<tr><td>chains</td><td></td></tr>
<tr><td>metre ruler</td><td></td></tr>
<tr><td>tape measure</td><td>✓</td></tr>
<tr><td>callipers</td><td></td></tr>
<tr><td>stop-watch</td><td></td></tr>
<tr><td>float</td><td></td></tr>
<tr><td>clinometer</td><td></td></tr>
<tr><td>ranging poles</td><td>✓</td></tr>
</table></td><td>2</td><td></td></tr>
<tr><td>4(b)(ii)</td><td>Which <u>one</u> of the following describes this method of sampling?

<u>Circle</u> your answer:

biased random stratified <u>systematic</u></td><td>1</td><td></td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4(c)</td><td>Describe <u>two</u> differences between the cross-section at Site 3 and the cross-section at Site 4.

<u>At Site 3:</u>
Cross-section is <u>only</u> 5.9 m wide
Cross-section is <u>only</u> 0.63 m (0.48 m average) deep
Riverbed is flatter
Deepest point is at 1.8 m width for Site 3 but 5.4 m width for Site 4

<u>At Site 4:</u>
Cross-section is wider / more distance across
Cross-section is deeper / 0.72 m (0.62 m average) deep
Cross-section bigger / bigger channel area</td><td>2</td><td>Must be a difference

Accept data if comparative terms such as ‘only’ used

Allow 5–5.8 m for Site 4

Accept opposites for Site 3 e.g. cross-section is narrower</td></tr>
<tr><td>4(d)(i)</td><td>Which <u>one</u> of the following is the correct calculation to work out the area of the cross-section of the river channel? Tick (✓) the correct answer.

<table>
<tr><th>calculation</th><th>tick (✓)</th></tr>
<tr><td>width − mean (average) depth</td><td></td></tr>
<tr><td>width + mean (average) depth</td><td></td></tr>
<tr><td>width × mean (average) depth</td><td>✓</td></tr>
<tr><td>width ÷ mean (average) depth</td><td></td></tr>
</table>
</td><td>1</td><td></td></tr>
</table>

Question	Answer	Marks	Guidance
4(d)(ii)	**What conclusion would the students make about <u>Hypothesis 1:</u> *The area of the cross-section of the river channel increases downstream*? Use data from Table 4.1 and Fig. 4.3 to support the conclusion.** <u>Conclusion</u> Hypothesis is correct / true / confirmed / accurate / agree / supported <u>Evidence</u> Cross-section increases from Site 1 to Site 4 Width <u>and</u> depth increase from Site 1 to Site 4 Table 4.1 shows e.g. Site 1 area = 0.13 m^2 and Site 4 area = 5.98 m^2 Fig. 4.3 e.g. Site 4 area of cross-section is visibly much bigger than Site 1 Fig. 4.3 shows a positive trend The area of the cross-section increases downstream from 0.13 m^2 at Site 1 to 5.98 m^2 at Site 4 = 2 marks	3	**Reserve 1 mark for conclusion** = 0 Yes Hypothesis is false / incorrect If no conclusion credit evidence **Reserve 1 mark for data** Accept paired data from **any two sites** Must have m^2 = 0 Width and depth data
4(e)(i)	**Describe how the students used the ranging poles, clinometer and tape measure shown in Fig. 4.2 to measure the gradient.** Measure 10m distance <u>along</u> river / downstream / upstream / distance between poles Put two ranging poles on / in riverbed Ranging poles must be vertical Students hold ranging poles at either end of measured distance Agree height on ranging pole / at or near top of ranging poles Line up identified position Use clinometer to measure gradient / slope / angle / degrees Repeat several times and calculate average	3	Credit appropriately labelled sketch = 0 Record result on clipboard Ranging poles at start and end of river = 'Just' if what follows makes sense

Question	Answer	Marks	Guidance
4(e)(ii)	**The students worked in two groups. Group A made four measurements at each site and Group B made one measurement at each site. Suggest why the results of Group A would be more reliable than the results of Group B.** Remove the effect of an anomaly Gives an average result One result may be inaccurately measured / eliminates error	**1**	Need <u>why</u> more reliable / accurate = 0 It is more accurate
4(f)(i)	**Which site (1 to 4) has the largest variation in measurements?** Site 2	**1**	
4(f)(ii)	**<u>Plot the average gradient for Site 3 on Fig. 4.4</u> using the results in Table 4.2.** Straight line plot from 7 (at distance 0 m) to 0 (at distance 10 m)	**1**	

Question	Answer	Marks	Guidance
4(f)(iii)	**Do the results shown in Table 4.2 and Fig. 4.4 support <u>Hypothesis 2:</u> *The gradient (angle of slope) of the river decreases downstream?* Support your answer with data from Table 4.2 and Fig. 4.4.** **THREE possible decisions** **EITHER** <u>Conclusion</u> Hypothesis is correct / true / confirmed / accurate / agree <u>Evidence</u> Overall gradient is less steep at Site 4 than Site 1 / downstream OR Site 4 is least steep / has gentlest gradient Site 1 gradient is 9° but at Site 4 it is 4° Fig. 4.4 shows a negative trend **OR** <u>Conclusion</u> Hypothesis is partly correct / partly true / partly confirmed / partly accurate	**3**	**Reserve 1 mark for conclusion** Accept yes or no for a conclusion because question asks 'Do the results…' If no conclusion credit evidence **Reserve 1 mark for data** Need units of measurement (°)
4(f)(iii)	<u>Evidence</u> Gradient is less steep overall BUT Site 2 is steeper than Site 1 Site 1 is 9° BUT increases to 12° at Site 2 **OR** <u>Conclusion</u> Hypothesis is not correct / not true / not confirmed / not accurate <u>Evidence</u> Site 2 is steeper than Site 1 Site 1 is 9° BUT increases to 12° at Site 2		