2013 Geology

Intermediate 2

Marking Instructions

Part One: General Marking Principles for Geology – Intermediate 2

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

(a) Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.

(b) Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

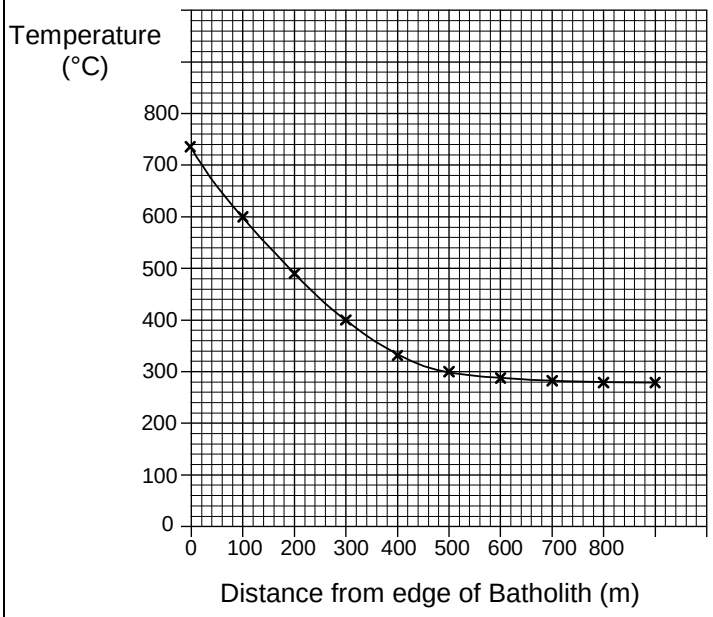
GENERAL MARKING ADVICE: Geology – Intermediate 2

The marking schemes are written to assist in determining the "minimal acceptable answer" rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessments and course assessments.

Part Two: Marking Instructions for each Question

Question			Expected Answer/s	Max Mark	Additional Guidance
1	**a**		Pyrite Talc Gypsum Malachite Magnetite Cassiterite Fluorite Garnet All 8 correct = 4 marks 6/7 correct = 3 marks 4/5 correct = 2 marks 2/3 correct = 1 mark	**4**	
1	**b**		Rock Salt Shale Greywacke Tuff Dolerite Quartzite Slate Granite All 8 correct = 4 marks 6/7 correct = 3 marks 4/5 correct = 2 marks 2/3 correct = 1 mark	**4**	
1	**c**		Spotted rock Migmatite Gneiss or mylonite Schist Spotted rock Mylonite 6 correct = 3 marks 4/5 correct = 2 marks 2/3 correct = 1 mark	**3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
2	**a**		Rock Structure A: Columnar jointing **(1)** Rock Structure B: Desiccation cracks/ mud cracks **(1)**	**2**	
2	**b**		Lava/magma cools **(1)** Contracts (towards equally spaced central points) **(1)** Joints open up in a hexagonal pattern **(1)**	**3**	
3	**a**		The boulders in the conglomerate have been eroded from igneous rock P **(1)** The conglomerate shows inverted graded bedding **(1)** The greywacke shows inverted graded bedding **(1)** Igneous rock P (dyke) has been eroded at the unconformity **(1)** The schist has to be older than the sedimentary rocks **(1)**	**2**	
3	**b**		Fold W was produced by **pulling/<u>pushing</u>** forces and is a/an **anticline/<u>syncline</u>** that has been turned upside down	**1**	
3	**c**		B → D → F → C → A → E oldest youngest 6 in correct sequence = 3 marks 4/5 in correct sequence = 2 marks 3 in correct sequence = 1 mark	**3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
4	**a**		 Labelling axes = 1 mark Suitable scales + using ≥ half the graph paper = 1 mark At least 7 correct plots = 1 mark	**3**	
4	**b**		As the distance from the batholith increases the temperature decreases **(1)**. At a fast rate to begin with (up to 400m) and then at a (much) slower rate **(1)**/Exponential decrease in temperature **(2)**	**2**	
4	**c**		Width of zone: 260 ±10 m 1 mark for dropping perpendiculars 1 mark for subtraction or 2 marks for the correct answer without any working Note: Answer consistent with the candidate's graph in 4b can be awarded 2 marks.	**2**	

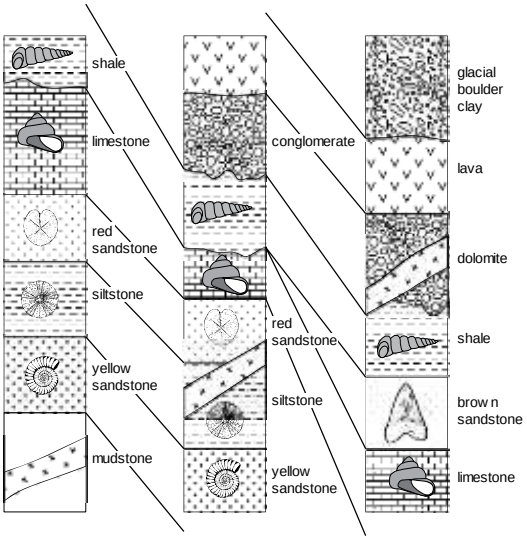
Question			Expected Answer/s	Max Mark	Additional Guidance
4	**d**	**i**	Pressure release/unloading leads to the granite expanding and jointing	**1**	
4	**d**	**ii**	A joint is a crack whereas the rocks on either side of a fault move relative to one another	**1**	
4	**d**	**iii**	Increase = 5·5 **(1)** % increase = $\frac{5 \cdot 5}{0 \cdot 5} \times 100$ = 1100 **(1)** % increase in thickness = 1100	**2**	
5	**a**		Name: Frost shattering/physical weathering (or any other reasonable answer) **(1)** Description: As water freezes in cracks it expands and breaks the road. (On the melting of the ice the broken road fragments are washed away or moved by traffic) **(1)**	**2**	
5	**b**		Roots grow underneath the pavement/into cracks. As they grow they become thicker and make the pavement uneven.	**1**	
5	**c**	**i**	It is more resistant to being broken up/worn away	**1**	
5	**c**	**ii**	Basalt: 8 Sandstone: 10 Granite: 7 Limestone: 5	**1**	

Question			Expected Answer/s	Max Mark	Additional Guidance
6	**a**		1. Whorl 2. Aperture 3. Septum 4. Chamber 5. Stipe 6. Theca 7. (Compound) eye 8. Tail (Pygidium) 8 correct = 4 marks 6/7 correct = 3 marks 4/5 correct = 2 marks 2/3 correct = 1 mark	**4**	
6	**b**		A Gastropod B Ammonite C Graptolite D Trilobite 4 correct = 2 marks 2/3 correct = 1 mark	**2**	
6	**c**		A	**1**	
6	**d**		How animal lived: Herbivore Reason: Flat teeth to crush food/ heavily armoured head for protection/slow moving due to short legs and heavy body How animal lived: Carnivore Reason: Piercing teeth to tear and hold prey/large claws on limbs to wound/fast moving due to relatively long legs allowing animal to catch prey 1 mark for each animal	**2**	

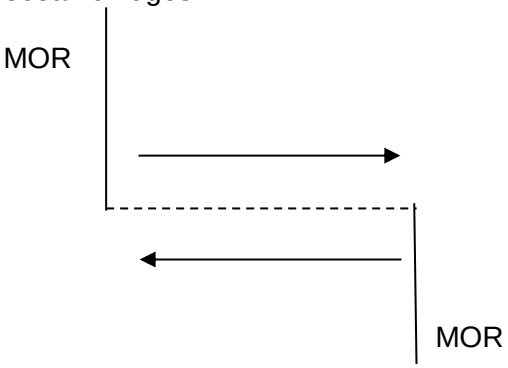
Question			Expected Answer/s	Max Mark	Additional Guidance
6	**e**		<table><tr><td>Thin test</td><td>✓</td></tr><tr><td>Heart shaped</td><td>✓</td></tr><tr><td>Teeth small or absent</td><td>✓</td></tr><tr><td>Few small spines</td><td>✓</td></tr></table> 4 correct = 2 marks 2/3 correct = 1 mark	**2**	
6	**f**		Grazing trail/footprint/burrow/bite mark/resting mark etc	**1**	
7	**a**		Reverse	**1**	
7	**b**		135 or 315°	**1**	
7	**c**		70°	**1**	
7	**d**		South West or 225°	**1**	
7	**e**		1.9 – 2.3 metres	**1**	
8	**a**		Syncline	**1**	
8	**b**		Side downthrown: North West **(1)** Reason: The wider deposit of limestone indicates less erosion **(1)** or younger rocks on NW side abut on older rocks on the SE thus the NW side moved down **(1)**	**2**	

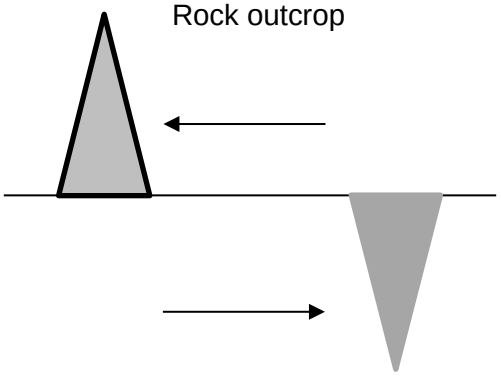
Question			Expected Answer/s	Max Mark	Additional Guidance
8	**c**		F → C → A → B → D → E oldest youngest 6 in correct sequence = 3 marks 4/5 in correct sequence = 2 marks 3 in correct sequence = 1 mark	**3**	
8	**d**		C and E	**2**	
8	**e**		Presence of fossil soil **(1)** Presence of only one baked margin **(1)** Small crystals (indicating rapid cooling) **(1)** Presence of vesicles **(1)** No chilled margins **(1)**	**2**	
8	**f**		• Awareness of tide times • Wear hard hats • Wear sturdy footwear • Wear warm clothing • Carry mobile phone • Carry first aid kit • Or any other reasonable answer 4 correct = 2 marks 3 correct = 1 mark	**2**	
9	**a**		Evidence: Rounded boulders Reason: resulting from attrition caused by waves Evidence: Stack at a distance from the sea Reason: it is the remains of an eroded headland Evidence: Cave/raised beach/fossil cliff Reason: they are well above the present sea level Evidence: Tree stumps on sea floor Reason: they grew above sea level (in the past)	**2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
9	**a**		continued Evidence: Glacial erratic/ evidence of glaciatra Reason: sea level fell when ice formed/ sea level rose when ice melted		
9	**b**		3	**1**	
9	**c**		**Any two of the following:** During the ice age sea level dropped as water was locked up as ice on the land (1) During the last ice age the land was depressed by the weight of the ice (1) After the ice age sea levels rose due to ice melt (1) Since the weight of the ice has gone the land has rebounded (1)	**2**	
10	**a**		Hawaiian volcanoes that have formed over a hot spot have wide bases and gently sloping sides. This is because they are made from **runny/viscous** lava called **andesite/basalt**.	**1**	
10	**b**		$\frac{9000}{3} = 3000$ 3000 lava flows	**1**	An answer of 2963 lava flows also acceptable (8/9 of 10 000m)
10	**c**	**i**	$\frac{900}{45} = 20$ 20 km/million years Accept 19.7 – 20.3km	**1**	
10	**c**	**ii**	West North West, accept North West	**1**	
10	**c**	**iii**	C	**1**	

<table>
<tr><th colspan="3">Question</th><th>Expected Answer/s</th><th>Max Mark</th><th>Additional Guidance</th></tr>
<tr><td>11</td><td>a</td><td></td><td> 

9/12 correct correlations = 2 marks
7/8 correct correlations = 1 mark</td><td>2</td><td></td></tr>
<tr><td>11</td><td>b</td><td></td><td>A</td><td>1</td><td></td></tr>
<tr><td>11</td><td>c</td><td></td><td>
<table>
<tr><th>Deposit</th><th>Environment that led to the deposit forming</th></tr>
<tr><td>Coal</td><td>Plants growing in swamps die but due to anaerobic conditions do not decay fully and accumulate as peat (1). This peat is then compressed and heated as result of more burial (1).</td></tr>
<tr><td>Coral limestone</td><td>Shallow warm tropical/ subtropical ocean (1) in which coral lived and died (1).</td></tr>
<tr><td>Spherical sand grains with a rough frosted surface</td><td>Desert environment with sand carried by the wind (1). The frosted surface is produced by attrition (1).</td></tr>
<tr><td colspan="2">Any 4</td></tr>
</table>
</td><td>4</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Expected Answer/s</th><th>Max Mark</th><th>Additional Guidance</th></tr>
<tr><td>12</td><td>a</td><td></td><td>3</td><td>1</td><td></td></tr>
<tr><td>12</td><td>b</td><td></td><td>
<table>
<tr><th>Feature</th><th>Name of feature</th></tr>
<tr><td>P</td><td>Rift valley</td></tr>
<tr><td>Q</td><td>Oceanic trench</td></tr>
<tr><td>R</td><td>Conservative margin</td></tr>
<tr><td>S</td><td>Lithosphere</td></tr>
<tr><td>T</td><td>Asthenosphere</td></tr>
<tr><td>U</td><td>Wadati – Benioff zone</td></tr>
</table>
All 6 correct = 3 marks
4/5 correct = 2 marks
2/3 correct = 1 mark
</td><td>3</td><td></td></tr>
<tr><td>12</td><td>c</td><td></td><td>Explosive/pyroclastic
OR
Andesitic/rhyolitic</td><td>1</td><td></td></tr>
<tr><td>12</td><td>d</td><td></td><td>Transform – associated with mid oceanic ridges
 

Tear – occurs within plates
 
</td><td>2</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Expected Answer/s</th><th>Max Mark</th><th>Additional Guidance</th></tr>
<tr><td>13</td><td>a</td><td></td><td>A and E</td><td>2</td><td></td></tr>
<tr><td>13</td><td>b</td><td></td><td>
<table>
<tr><th>Property of wave</th><th>P, S or L</th></tr>
<tr><td>The slowest moving wave</td><td>L</td></tr>
<tr><td>A compressional wave where the particles of rock are pushed close together and pulled further apart</td><td>P</td></tr>
<tr><td>A surface wave that behaves like an ocean wave</td><td>L</td></tr>
<tr><td>The particles move up and down at right angles to the wave direction</td><td>S</td></tr>
</table>
4 correct = 2 marks
3 correct = 1 mark
</td><td>2</td><td></td></tr>
</table>

[END OF MARKING INSTRUCTIONS]