



2015 Managing Environmental Resources

Intermediate 2

Finalised Marking Instructions

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Part One: General Marking Principles for: Managing Environmental Resources 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: Managing Environmental Resources 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

SECTION 1

Question			Expected Answer(s)	Max Mark	Additional Guidance
1.	(a)	(i)	Any two from whisky, caramel, glass bottles, labels, cardboard (car park, building, fence)	1	
1.	(a)	(ii)	Water	1	
1.	(a)	(iii)	Wood/trees	1	
1.	(a)	(iv)	Non-renewable – comes from a finite source. Renewable – rocks break down into sand	1	
1.	(a)	(v)	Stop it being stolen/custom and excise/or other acceptable answer	1	
1.	(b)		£600,000	1	
1.	(c)	(i)	Easier transport	1	
1.	(c)	(ii)	To see if there are any pollutants/ air quality check	1	
1.	(d)		Carbon dioxide, water = oxygen	1	
2.	(a)	(i)	Landfill	1	
2.	(a)	(ii)	longer sunshine hours per year	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(a)	(iii)	More rainfall per year/constant supply of rain/snow melts to top up reservoir/steep hills to generate fast flowing water/impermeable rocks to store water/big u shaped valleys to dam/corries to use for pump storage schemes Any 2	1 1	
2.	(b)	(i)	No visual or audible pollution/no carbon emissions/high tidal streams/ constant tidal movement/ tide predicable twice a day – gravitational pull of moon. Any 2	2	
2.	(b)	(ii)	Habitat destruction	1	
2.	(b)	(iii)	Massive costs connection wave and tidal projects in the region to the grid/getting it to the population.	1	
2.	(c)	(i)	Uranium	1	Not plutonium
2.	(c)	(ii)	Storage/radioactive waste disposal an issue/explosion & contamination of sea, land and air Safety when decommissioning plant/terrorism attack. Any 2	1 1	
2.	(c)	(iii)	Small amount of fuel but large amount of energy produced/no carbon emissions.	1	
2.	(c)	(iv)	France	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
2.	(d)		Fuel = Wood/dung (biofuel?) Use = cooking/firewood for heating.	1 1	
2.	(e)		Switch electrical goods off standby/ fill kettle half full/energy saving light bulbs/loft insulation & wall insulation/ put jumper on & turn thermostats down/take a shower not a bath so less water to heat etc. Any 2	1	
3.	(a)	(i)	4	1	
3.	(a)	(ii)	Dragonfly and stonefly, Reason: dragonfly and caddisfly eat worms and stone fly and caddisfly because they eat mayfly.	1	
3.	(a)	(iii)	Algae, river limpet, trout, Kingfisher. (1) Correct order. (1)	2	
3.	(a)	(iv)	Decrease, Reason: less trout because crayfish eats the trout's food.	1	
3.	(a)	(v)	No predator.	1	
3.	(b)		Use a net, (1 mark) sweep for a set time and collect organisms in a tray (1 mark) .	2	
3.	(c)	(i)	Heat/movement/indigestible material. Any 2	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
3.	(c)	(ii)	Direction of energy flow.	1	
3.	(d)	(i)	Go to 2, waterlouse, 3, long thin body/mayfly, invertebrate with 2 pronged tail. All 5 for 3 marks 3/4 for 2 marks 1/2 for 1 mark	3	
3.	(d)	(ii)	Eg stonefly Both have feelers/antennae stonefly less than 10 legs, shrimp more than 10.	1 1	Must mention a contrast
4.	(a)	(i)	Herbivore.	1	
4.	(a)	(ii)	Heather moorland.	1	
4.	(b)		Direct.	1	
4.	(c)	(i)	A symbiotic relationship in which one organism harms another.	1	
4.	(c)	(ii)	1232.	1	
4.	(d)		Fenbendazole which kills all the parasites, larvae and eggs and then allows more young grouse to survive and breed.	1	
4.	(e)		They kill pests which are the food of other animals, so they kill other animals/bioaccumulation	2	
4.	(f)		Species enhancement action plan.	1	
5.	(a)	(i)	Less.	1	
5.	(a)	(ii)	Land lost/smell/Visual pollution/run off contamination Any 2	1 1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
5.	(a)	(iii)	Composting.	1	
5.	(b)		£80	1	
5.	(c)		Prevention – food, only buy what you need; Reuse – reuse plastic bags, Recycle – put old clothes in the recycling bank for processing and not in the bin for landfill	1 1 1	
5.	(d)		Bacteria/fungi.	1	Not worms
5.	(e)		Nitrogen.	1	
6.	(a)	(i)	1 mark for each correct plotting.	3	
6.	(a)	(ii)	No. Do not flower in winter when temperature is lower.	1	
6.	(a)	(iii)	Repeated and an average taken.	1	
6.	(b)	(i)	Quadrat; thrown randomly; count number of plants within quadrat. Any 2	2	
6.	(b)	(ii)	Soil moisture/pH.	1	
6.	(c)		Not enough light.	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
7.	(a)		456854, caves, waterfall, 483856, place of worship. All 5 for 3 marks, 3/4 for 2 marks 1/2 for 1 mark	3	
7.	(b)	(i)	Good defensive site.	1	
7.	(b)	(ii)	Hard resistant rock, less prone to weathering process.	1	
7.	(c)		Limited access by road/Too steep for building/Poor soils for growing crops. Any 2	2	
7.	(d)	(i)	Museum, walking, visitor centre, piers, fort, bird reserve, campsite. Any two with GR	1	
7.	(d)	(ii)	Sheltered harbour/deep water/headland and bay for shelter.	1	
7.	(d)	(iii)	Lighthouse + GR489832/3	1	
7.	(d)	(iv)	467882 Sandy beach easier to come ashore.	1	
7.	(e)	(i)	Wind/wind turbine GR477865	1	
7.	(e)	(ii)	No carbon emissions/not using a fossil fuel including peat so saving these and wind is renewable/will not run out. Any 1	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
7.	(f)	(i)	2km ²	1	
7.	(f)	(ii)	Mountain biking/bird watching.	1	
7.	(f)	(iii)	Too cold/too windy/short growing season/cold temperatures/shallow soil.	1	
7.	(g)	(i)	Provide jobs, income/help economy on island, stop youngsters leaving for a job on mainland, start new industry on island – fish processing plant/ smokehouse. Any 2	1 1	
7.	(g)	(ii)	Visual pollution, chemicals from fish farm in water – basking sharks, otters & seals, escapees, oil slicks from boats serving fish farm, popular diving site with crabs, lobster, wrasse, anemones, scallops, ground for golden eagle to hunt, breeding birds – shag, cormorant disturbed. Any 2	1 1	
7.	(h)		User groups + named example (1 mark) Description of use (1 mark)	2	

SECTION 2

Option A

Question	Expected Answer(s)	Max Mark	Additional Guidance
(a)	<p>The formation and effects of acid rain</p> <p>Formation</p> <p>Natural sources such as erupting volcanoes, rotting vegetation and sea sprays produce sulphur dioxide (1) and fires, bacterial decomposition and lightning generate nitrogen dioxide (1)</p> <p>These chemicals get mixed up with water and oxygen/ (1) and are dispersed over large areas because of wind patterns (1)</p> <p>Man-made sources include emission of sulphur dioxide and nitrogen oxides (1) due to combustion of fossil fuels such as coal and oil. (1)</p> <p>These gases react in the atmosphere with water, (1) oxygen and other chemicals to form various acidic compounds such as sulphuric acid, ammonium nitrate and nitric acid. (1)</p> <p>Winds blow these acidic compounds to fall back to the ground in the form of acid rain or other forms of precipitation. (1)</p> <p>Effects of Acid Rain</p> <ul style="list-style-type: none"> • Effect of Aquatic environment – acids get accumulated in the water and lower the overall pH. If the pH level falls below 4.8 it becomes hostile for the survival of aquatic life. (1) • Effect on Forests – It makes trees vulnerable to disease, extreme weather and insects by destroying their leaves, damaging the bark and arresting their growth. (1) • Effect on Soil – It kills useful micro-organisms and leaches nutrients out of the soil. May lead to calcium and other nutrient deficiency, producing infertile soils. (1) • Effect on Architecture and Buildings – Acid rain on buildings, especially those constructed with limestone, react with the minerals and corrode them away. (1) • Effect on Public Health – When in the atmosphere, sulphur dioxide and nitrogen oxide gases and their particulate matter derivatives like sulphates and nitrates, degrades visibility and can cause accidents, leading to injuries and deaths. Also breathing problems. (1) 	6	Any 6

Question		Expected Answer(s)	Max Mark	Additional Guidance
	(b)	<p>Energy efficient schemes for sustainability</p> <p>In the home:</p> <ul style="list-style-type: none"> • switching off lights, power sockets, phone chargers and televisions when not in use • using energy-efficient light bulbs and rechargeable batteries • recycling and reusing plastics and oil-based products • insulating house roofs, blocking drafts, using double-glazing and more efficient heating systems • considering introducing solar panels, or switching to an electricity supplier that supplies green electricity <p>Transport:</p> <ul style="list-style-type: none"> • energy efficient bus • using smaller more energy-efficient cars • walking, cycling or using public transport rather than fossil-fuel powered cars • reducing the number of aircraft journeys taken (especially short-haul flights) 	4	Any 4

Option B

Question	Expected Answer(s)	Max Mark	Additional Guidance
(a)	<p>The carbon cycle</p> <p>Carbon enters the atmosphere as carbon dioxide from respiration and combustion. (1)</p> <p>Carbon dioxide is absorbed by producers to make carbohydrates in photosynthesis. (1)</p> <p>Animals feed on the plant passing the carbon compounds along the food chain. (1) Most of the carbon they consume is exhaled as carbon dioxide formed during respiration. (1)</p> <p>The animals and plants eventually die. (1)</p> <p>Dead organisms and waste material are broken down by decomposers and returned to the atmosphere as carbon dioxide. (1)</p> <p>Decomposers include bacteria and fungi. (1)</p> <p>Some plant and animal material may be converted into fossil fuel for combustion. (1)</p>	6	Any 6
(b)	<p>The role of indicators in pollution</p> <p>One mark awarded for the definition and three marks awarded for a detailed example.</p> <p>The presence or absence of certain living organisms acts as an indicator of pollution.</p> <p>Lichens are plants that grow in exposed places such as rocks or tree bark. Sulphur dioxide in rain water can prevent them from growing. This makes lichens natural indicators of air pollution. For example:</p> <ul style="list-style-type: none"> • bushy lichens need really clean air • leafy lichens can survive a small amount of air pollution • crusty lichens can survive in more polluted air <p>in places where lichens are growing, it is often a sign that the air is heavily polluted with sulphur dioxide</p>	4	

Question		Expected Answer(s)	Max Mark	Additional Guidance										
	(b)	<p>(cont)</p> <p>Water pollution is caused by the discharge of harmful substances into rivers, lakes and seas. Many aquatic invertebrate animals cannot survive in polluted water, so their presence or absence indicates the extent to which a body of water is polluted.</p> <table border="1"> <thead> <tr> <th>Level of water pollution</th> <th>Indicator species</th> </tr> </thead> <tbody> <tr> <td>clean</td> <td>mayfly larva</td> </tr> <tr> <td>low</td> <td>freshwater shrimp</td> </tr> <tr> <td>high</td> <td>water louse</td> </tr> <tr> <td>very high</td> <td>rat-tailed maggot, sludgeworm</td> </tr> </tbody> </table>	Level of water pollution	Indicator species	clean	mayfly larva	low	freshwater shrimp	high	water louse	very high	rat-tailed maggot, sludgeworm		
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Option C

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	(a)	<p>Weather elements and techniques used to measure them</p> <table border="1"> <thead> <tr> <th>Element</th> <th>Instrument</th> <th>Unit</th> <th>Location</th> </tr> </thead> <tbody> <tr> <td>Temperature</td> <td>Thermometer</td> <td>°C</td> <td>Inside Stevenson Screen</td> </tr> <tr> <td>Precipitation</td> <td>Rain gauge</td> <td>mm</td> <td>Dug into ground</td> </tr> <tr> <td>Sunshine</td> <td>Sunshine recorder</td> <td>hours</td> <td>High on pedestal</td> </tr> <tr> <td>Air pressure</td> <td>Barograph</td> <td>mb</td> <td>Kept indoors or in Stevenson Screen</td> </tr> <tr> <td>Wind direction</td> <td>Wind vane</td> <td>N, S, etc</td> <td>High above the ground</td> </tr> <tr> <td>Wind speed</td> <td>Anemometer</td> <td>km/hr or knots</td> <td>High above the ground</td> </tr> </tbody> </table> <p>Two named elements with a detailed technique of measurement - 4 marks Then two other named elements or named with the technique - 2 marks</p> <p>Rainfall</p> <p>Rainfall is measured using a rain gauge. The depth of rain is usually measured daily, for example at the same time every morning. A simple rain gauge consists of a funnel that empties into a bottle. The daily contents of the bottle are poured into a measuring cylinder. This is calibrated so that it reads the depth of rainfall in millimetres.</p> <p>Temperature</p> <p>An ordinary thermometer can be used to measure the temperature in an environment. Traditional maximum and minimum thermometers have a U-shaped tube. Each side contains a pin which moves inside with the liquid: one pin records the maximum temperature; and the other pin records the minimum temperature. After readings have been taken, the pins are reset using a magnet. A digital thermometer connected to a data logger allows an almost continuous measurement of temperature over time. It also has the advantage that no one needs to be there to take a reading.</p>	Element	Instrument	Unit	Location	Temperature	Thermometer	°C	Inside Stevenson Screen	Precipitation	Rain gauge	mm	Dug into ground	Sunshine	Sunshine recorder	hours	High on pedestal	Air pressure	Barograph	mb	Kept indoors or in Stevenson Screen	Wind direction	Wind vane	N, S, etc	High above the ground	Wind speed	Anemometer	km/hr or knots	High above the ground	6	
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Question		Expected Answer(s)	Max Mark	Additional Guidance										
	(b)	<p>A conflict of interest and its resolution</p> <ul style="list-style-type: none"> Loch Lomond and Trossachs National Park – environmental problems caused by many different people using the loch. 	4											
		<table border="1"> <thead> <tr> <th>Named groups and conflict of interest</th> <th>Resolution</th> </tr> </thead> <tbody> <tr> <td>Fishermen and wild camping leaving rubbish on banks which can harm wildlife</td> <td>Fines and a ban on wild camping in the park</td> </tr> <tr> <td>Accidents with speed boats, jet skiers and wind sports and bank erosion which harms wildlife</td> <td>Zoning of the loch and a speed restriction enforced by police on the loch</td> </tr> <tr> <td>Footpath erosion – visual pollution – by visitors which causes habitat damage</td> <td>Stone pitching, re-seeding by volunteers/park employees</td> </tr> <tr> <td>Farmers and walkers – gates left open and wildlife disturbed, litter dropped and animals eat this, dogs chase livestock</td> <td>Educate the public in the Scottish Outdoor Access Code at a visitor centre in Balloch. Use of advertising and signs to remind visitors re code.</td> </tr> </tbody> </table>	Named groups and conflict of interest	Resolution	Fishermen and wild camping leaving rubbish on banks which can harm wildlife	Fines and a ban on wild camping in the park	Accidents with speed boats, jet skiers and wind sports and bank erosion which harms wildlife	Zoning of the loch and a speed restriction enforced by police on the loch	Footpath erosion – visual pollution – by visitors which causes habitat damage	Stone pitching, re-seeding by volunteers/park employees	Farmers and walkers – gates left open and wildlife disturbed, litter dropped and animals eat this, dogs chase livestock	Educate the public in the Scottish Outdoor Access Code at a visitor centre in Balloch. Use of advertising and signs to remind visitors re code.		
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		Groups, conflict and resolution must be detailed in an example.												

[END OF MARKING INSTRUCTIONS]