



ENVIRONMENTAL MANAGEMENT

0680/43

Paper 4

May/June 2018

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.

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PUBLISHED**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.

Question	Answer	Marks
1(a)(i)	2.24(%) ;; <i>(if answer incorrect, allow one mark for 350 000 / 15.6 million × 100 [1]);</i>	2
1(a)(ii)	4 (years);	1
1(a)(iii)	27 (USD) AND 64 (USD); (20)05 AND (20)08;	2
1(a)(iv)	<i>any two from:</i> (over time the) value increases / can gain profit; only short term drops in price; constant demand / demand remains high; AVP;	2
1(b)(i)	igneous;	1
1(b)(ii)	<i>any two from:</i> diverging plates / weakness in Earth's crust; (molten) magma pushed up; cools near surface; minerals formed (as magma cools);	2
1(c)(i)	<i>pH:</i> drops / more acidic with increasing distance (into the mining area); <i>cobalt:</i> stays the same / no change;	2
1(c)(ii)	0.88 (ppm);	1
1(c)(iii)	<i>any three from:</i> water too acidic / pH too low; materials / metals / sulfate / nickel / copper, are toxic / poisonous; sediments build-up; (sediment makes) photosynthesis impossible; (sediment) blocks gills;	3

Question	Answer	Marks
1(c)(iv)	<p><i>any three from:</i> January has more rainfall than September / 137 mm more rainfall in January; so more dilution; so lower concentrations; or concentrations remain the same / are higher, in January; as more pollutants washed out (of the waste heap); AVP;</p>	3
1(d)(i)	<p><i>total number of plants:</i> 0–60 m: increase; 70–100 m: no further change / little change / increases then no change;</p> <p><i>number of plant species:</i> 0–60 m: (slight) increase / hardly any plant species / fluctuates; 70–100 m: constant / stays the same;</p>	4
1(d)(ii)	<p><i>any four from:</i> same overall pattern; more plants (in second survey); with figures to support; more species (in second survey); 0–50 m same number (of species); with figures to support; figures to compare surveys ;;</p>	4
1(d)(iii)	<p><i>any two from:</i> less waste production / reduced mining activity; the wet season; spring / summer, versus, autumn / winter; has increased growth of, dormant plants / seeds; more nutrients available; seeds brought into area by, winds / animals; AVP;</p>	2

Question	Answer	Marks
1(d)(iv)	<p><i>any three from:</i> idea of control survey; repeat the survey; survey more waste dumps; more surveys around one waste dump; in different locations; longer transects; survey at closer intervals; different times of year; identify species;</p>	3
1(d)(v)	<p><i>any three from:</i> intercept rainfall; so less infiltration / more evaporation; so less pollutants washed out of the dump; into, groundwater / streams / rivers; (use) plants or roots that take up toxins;</p>	3
1(e)(i)	offer, grants / tax breaks / subsidies / free land / provide equipment / explain the benefits / advertising campaign;	1
1(e)(ii)	<p><i>any three from:</i> more jobs; increased value of exports; increase in (national / GDP) income; so can invest in infrastructure; saves on transport costs; environmentally less damaging; reduces poverty / raises standard of living; AVP;</p>	3

Question	Answer	Marks
2(a)(i)	<i>any two from:</i> buying the licence; cost of transport; mining equipment; named example of mining equipment, e.g. picks / shovels / water pumps / ladder; safety equipment; waste remediation; AVP;	2
2(a)(ii)	<i>any one from:</i> lung damage; rock fall; injuries;	1
2(b)(i)	(from) south east;	1
2(b)(ii)	linear scale and orientation; x-axis labelled with units; y-axis labelled with units; correct plots;	4
2(b)(iii)	(leaf) length increases with distance (from mine);	1
2(b)(iv)	<i>any two from:</i> establish dust free leaf length / a control; more samples; sample further away; sample closer together; repeat on other mines; repeat the survey; specified position of leaves on plants; sample other species; AVP;	2

Question	Answer	Marks
2(b)(v)	<p><i>any three from:</i> less light absorbed; so less photosynthesis; blocks stomata; <i>idea of</i> affects evaporation or transpiration; plants grow slower / less growth;</p>	3
2(c)(i)	<p><i>any three from:</i> (dust) damage to crops / reduce, crop yield / food supply; damage to soil; land can't be used for crops or livestock; less available land; danger to livestock; alters water supply; theft; AVP;</p>	3
2(c)(ii)	<p><i>any two from:</i> (time for) impact assessment / risk assessment; cost benefit analysis; consultation period; farmers / people, object to plans; bureaucracy; AVP;</p>	2
2(c)(iii)	<p><i>any two from:</i> finite resource; environmental damage; explanation of non-sustainability, e.g. current mining meets the needs of the present but will not meet the needs of the future; AVP;</p>	2