



BOARD OF STUDIES
NEW SOUTH WALES

2011 HSC Earth and Environmental Science Marking Guidelines

Section I, Part A

Multiple-choice Answer Key

Question	Answer
1	B
2	A
3	C
4	B
5	D
6	D
7	A
8	C
9	B
10	B
11	D
12	A
13	C
14	B
15	C
16	C
17	B
18	A
19	B
20	A

Section I, Part B**Question 21 (a)**

Criteria	Marks
<ul style="list-style-type: none">• Correctly identifies both types of crust	1

Question 21 (b)

Criteria	Marks
<ul style="list-style-type: none">• Describes TWO differences• Gives a reason for each difference	3
<ul style="list-style-type: none">• Identifies ONE difference AND• Gives a reason for the difference OR <ul style="list-style-type: none">• Describes TWO differences OR <ul style="list-style-type: none">• Describes TWO differences and gives one reason	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 22 (a)(i)

Criteria	Marks
<ul style="list-style-type: none">• Correctly gives the percentage	1

Question 22 (a)(ii)

Criteria	Marks
<ul style="list-style-type: none">• Correctly plots an area	1

Question 22 (a)(iii)

Criteria	Marks
<ul style="list-style-type: none">• Correctly plots an area	1

Question 22 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of a hotspot (intraplate volcanic activity) • Correctly identifies the trend in the graph • Correctly identifies the movement of the crust in relation to the hotspot 	3
<ul style="list-style-type: none"> • Displays some knowledge of a hotspot • Uses information from the graph and/map OR <ul style="list-style-type: none"> • Displays knowledge of hotspot volcanism 	2
<ul style="list-style-type: none"> • Provides some relevant information 	1

Question 23

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of the damage to buildings caused by earthquakes • Clearly links the cause of the damage to solutions • Provides solutions for minimising damage 	4
<ul style="list-style-type: none"> • Provides some understanding of the damage to buildings caused by earthquakes • Outlines the cause of the damage • Outlines solutions for minimising damage 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 24

Criteria	Marks
<ul style="list-style-type: none"> • Details the impact for THREE hazards 	3
<ul style="list-style-type: none"> • Details the impact for TWO hazards 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 25 (a)

Criteria	Marks
<ul style="list-style-type: none"> • Draws a flowchart that outlines deposition of BIF bands, with three stages • Puts steps in correct sequence including cyclic nature 	3
<ul style="list-style-type: none"> • Draws a flowchart that shows an understanding of BIFs 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 25 (b)

Criteria	Marks
• Shows clearly how BIFs provide evidence that life existed in the oceans	2
• Gives some relevant information	1

Question 26 (a)

Criteria	Marks
• Correctly completes the table providing information on both amphibians and reptiles	3
• Correctly completes the table for amphibians OR • Correctly completes table for reptiles OR • Provides some relevant information for both amphibians and reptiles	2
• Gives some relevant information	1

Question 26 (b)

Criteria	Marks
• Sketches in general terms two challenges • Gives similarities or differences for the adaptive strategies	4
• Identifies two challenges • Gives relevant information regarding how each challenge was overcome	2–3
• Gives some relevant information	1

Question 27

Criteria	Marks
• Provides a sound knowledge of the cause and effect of mass extinctions • Provides a sound knowledge of the cause and effect of smaller extinction events • Gives similarities or differences • Provides examples to support the comparison	4–5
• Gives some information on the causes and effects of mass extinctions and smaller extinction events • Provides an example	2–3
• Gives some relevant information	1

Question 28

Criteria	Marks
<ul style="list-style-type: none">• Sketches in general terms TWO environmental problems• Provides one solution for each problem	4
<ul style="list-style-type: none">• Sketches in general terms at least one problem and provides some information on solutions	2–3
<ul style="list-style-type: none">• Gives some relevant information	1

Question 29 (a)

Criteria	Marks
<ul style="list-style-type: none">• Identifies TWO secondary sources	1

Question 29 (b) (i)

Criteria	Marks
<ul style="list-style-type: none">• Provides an understanding of methods/processes to validate information	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 29 (b) (ii)

Criteria	Marks
<ul style="list-style-type: none">• Provides an understanding of methods/processes to determine the reliability of information	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 30 (a)

Criteria	Marks
<ul style="list-style-type: none">• Sketches in general terms TWO practices that contribute to salinity	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 30 (b)

Criteria	Marks
<ul style="list-style-type: none">• Identifies ONE management strategy• Gives reasons for using the strategy	3
<ul style="list-style-type: none">• Names ONE management strategy• Gives some information about the strategy	2
<ul style="list-style-type: none">• Gives relevant information	1

Question 31

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a breadth, or depth, of knowledge and understanding of Earth's processes, environmental factors and management practices • Describes the fragile nature of Australian ecosystems • Makes a judgement • Demonstrates a coherent and logical progression of thought and includes correct use of scientific principles and ideas 	6–7
<ul style="list-style-type: none"> • Provides a knowledge and understanding of Earth's processes, and environmental factors and management practices • Outlines/identifies aspects of Australian ecosystems • Tenuously makes a judgement • Uses relevant terminology and/or progression of thought 	4–5
<ul style="list-style-type: none"> • Recalls relevant knowledge of Earth's processes, AND/OR the Australian environment and or its natural resources and/or environmental practices AND/OR attempts to make a judgement • Uses some appropriate terminology and/or progression of thought 	2–3
<ul style="list-style-type: none"> • Recalls some relevant information 	1

Section II
Question 32 (a) (i)

Criteria	Marks
<ul style="list-style-type: none"> • Identifies the patterns for each species • Gives at least ONE similarity or difference in the patterns 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (a) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Identifies the differences in the patterns • Gives at least ONE reason for the differences 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of ballast water and its role in introducing species • Makes a clear judgement • Refers to the stimulus material 	4
<ul style="list-style-type: none"> • Gives some information about ballast water and its role in introducing species • Makes a judgement and/or refers to the stimulus material 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (c)

Criteria	Marks
<ul style="list-style-type: none"> • Names an introduced species • Outlines strategies used to control the species • Gives the differences or similarities between the strategies 	4
<ul style="list-style-type: none"> • Names an introduced species • Demonstrates a knowledge of pest control • Gives a similarity or difference 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (d) (i)

Criteria	Marks
<ul style="list-style-type: none"> • Presents the results in a graph, table or other appropriate format 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (d) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Identifies the trends in the data • Draws on data in the results • Gives a relevant conclusion 	3
<ul style="list-style-type: none"> • Gives a relevant conclusion • Identifies the trends OR draws on data in the results 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 32 (d) (iii)

Criteria	Marks
• Sketches in general terms ONE method	2
• Gives some relevant information	1

Question 32 (e)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a breadth, or depth, of knowledge and understanding of the Australian environment and introduced species • Describes the impact of introduced species • Clearly makes a judgement relating to the impact of humans • Demonstrates a coherent and logical progression of thought and includes correct use of scientific principles and ideas 	6
<ul style="list-style-type: none"> • Provides a knowledge and understanding of the Australian environment and introduced species • Outlines/identifies the impact of introduced species • Tenuously makes, or attempts to make, a judgement relating to the impact of humans • Uses relevant terminology and/or progression of thought 	4–5
<ul style="list-style-type: none"> • Recalls relevant knowledge of the Australian environment and/or introduced species and/or impact of introduced species • Uses some appropriate terminology and/or progression of thought 	2–3
• Recalls some relevant information	1

Question 33 (a) (i)

Criteria	Marks
<ul style="list-style-type: none"> • Gives an example • States the meaning of <i>non-renewable resource</i> 	1

Question 33 (a) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of catalytic cracking • Gives at least ONE reason for catalytic cracking 	3
<ul style="list-style-type: none"> • Gives some information about catalytic cracking OR <ul style="list-style-type: none"> • Gives at least one reason for catalytic cracking 	2
• Gives some relevant information	1

Question 33 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of drilling and ONE geophysical technique • Supports the need for a combination of both techniques 	4
<ul style="list-style-type: none"> • Gives some information about drilling and ONE geophysical technique • Comments on the selection of ONE or BOTH techniques 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 33 (c)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound understanding of coalification and hydrocarbon maturation • Gives similarities or differences 	4
<ul style="list-style-type: none"> • Demonstrates a knowledge of coalification or hydrocarbon maturation OR <ul style="list-style-type: none"> • Gives some information on coalification and/or hydrocarbon maturation and • Gives some similarities or differences 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 33 (d) (i)

Criteria	Marks
<ul style="list-style-type: none"> • Presents the results in a graph, table or other appropriate format 	2
<ul style="list-style-type: none"> • Gives relevant information 	1

Question 33 (d) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Identifies the trends in the data • Draws on data in the results • Gives a relevant conclusion 	3
<ul style="list-style-type: none"> • Gives a relevant conclusion • Identifies the trends or draws on data in the results 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 33 (d) (iii)

Criteria	Marks
• Sketches in general terms ONE method	2
• Gives some relevant information	1

Question 33 (e)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a breadth, or depth, of knowledge and understanding of present and future use of fossil fuels and alternative sources of energy • Describes society's use of energy • Makes a judgement on the need for changes in patterns of energy use • Demonstrates a coherent and logical progression of thought and includes correct use of scientific principles and ideas 	6
<ul style="list-style-type: none"> • Displays a knowledge and understanding of fossil fuels and alternative sources of energy • Outlines/identifies society's use of energy • Tenuously makes, or attempts to make, a judgement on the need for changes in patterns of energy use • Uses relevant terminology and/or progression of thought 	4-5
<ul style="list-style-type: none"> • Recalls relevant knowledge of present and future use of fossil fuels and/or alternative source of energy and/or society's use of energy • Uses some appropriate terminology and/or progression of thought 	2-3
• Recalls some relevant information	1

Question 34 (a) (i)

Criteria	Marks
• Names ONE metal and gives its province	1

Question 34 (a) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Gives the geological features of the province • States how the mineralisation formed • Relates the minerals to the geological features 	3
• Provides some information on the province and/or the mineralisation	2
• Gives some relevant information	1

Question 34 (b)

Criteria	Marks
<ul style="list-style-type: none">• Outlines the trends in the graph• Gives reasons for the trends in the graph, drawn from mining and rehabilitation activities	4
<ul style="list-style-type: none">• Comments on the trends in the graph• Gives information about mining and rehabilitation	2–3
<ul style="list-style-type: none">• Gives some relevant information	1

Question 34 (c)

Criteria	Marks
<ul style="list-style-type: none">• Demonstrates a sound understanding of a government policy AND a landmark legal decision• Provides features of the impact of these on mining operation in Australia	4
<ul style="list-style-type: none">• Gives some information on landmark legal decisions and/or government policies• Identifies an impact on mining in Australia	2–3
<ul style="list-style-type: none">• Gives some relevant information	1

Question 34 (d) (i)

Criteria	Marks
<ul style="list-style-type: none">• Presents the results in a graph, table or other appropriate format	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 34 (d) (ii)

Criteria	Marks
<ul style="list-style-type: none">• Identifies the trends in the data• Draws on data in the results• Gives a relevant conclusion	3
<ul style="list-style-type: none">• Gives a relevant conclusion• Identifies the trends or draws on data in the results	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 34 (d) (iii)

Criteria	Marks
<ul style="list-style-type: none">• Sketches in general terms ONE method	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 34 (e)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a breadth, or depth, of knowledge and understanding of exploration and exploitation of mineral resources • Describes environmental issues relating to mining • Makes a judgement on issues related to mining • Demonstrates a coherent and logical progression of thought and includes correct use of scientific principles and ideas 	6
<ul style="list-style-type: none"> • Displays a knowledge and understanding of exploration and exploitation of mineral resources • Outlines/identifies environmental issues relating to mining • Tenuously makes, or attempts to make, a judgement on environmental issues relating to mining • Uses relevant terminology and/or progression of thought 	4–5
<ul style="list-style-type: none"> • Recalls relevant of exploration of mineral resources and/or exploitation of mineral resources and/or environmental issues • Uses some appropriate terminology and/or progression of thought 	2–3
<ul style="list-style-type: none"> • Recalls some relevant information 	1

Question 35 (a) (i)

Criteria	Marks
<ul style="list-style-type: none"> • Sketches in general terms ONE influence of light on the distribution of organisms 	1

Question 35 (a) (ii)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound understanding of hydrothermal vents • Relates the features of hydrothermal vents to life in oceans 	3
<ul style="list-style-type: none"> • Gives some information on hydrothermal vents and/or their influence on marine life 	2
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 35 (b)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a sound knowledge of technologies used to study oceans • Makes a judgement on the value of these technologies in increasing understanding of oceans 	4
<ul style="list-style-type: none"> • Gives some information on technologies • Makes a judgement 	2–3
<ul style="list-style-type: none"> • Gives some relevant information 	1

Question 35 (c)

Criteria	Marks
<ul style="list-style-type: none">• Gives the features of the sediments found at X and Y• Details how the sediments are formed	4
<ul style="list-style-type: none">• Gives some information about the sediments and their formation at X and Y	2–3
<ul style="list-style-type: none">• Gives some relevant information	1

Question 35 (d) (i)

Criteria	Marks
<ul style="list-style-type: none">• Presents the results in a graph, table or other appropriate format	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 35 (d) (ii)

Criteria	Marks
<ul style="list-style-type: none">• Identifies the trends in the data• Draws on data in the results• Gives a relevant conclusion	3
<ul style="list-style-type: none">• Gives a relevant conclusion• Identifies the trends or draws on data in the results	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 35 (d) (iii)

Criteria	Marks
<ul style="list-style-type: none">• Sketches in general terms ONE method	2
<ul style="list-style-type: none">• Gives some relevant information	1

Question 35 (e)

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates a breadth, or depth, of knowledge and understanding of human activities in the oceans and the biological resources • Describes generally or specifically the impact of human activities • Makes a judgement on the impact of human activities on the biological resources • Demonstrates a coherent and logical progression of thought and includes correct use of scientific principles and ideas 	6
<ul style="list-style-type: none"> • Displays a knowledge and understanding of human activities in the oceans and the biological resources • Outlines/identifies the impact of human activities • Tenuously makes, or attempts to make, a judgement on the impact of human activities on the biological resource • Uses relevant terminology and/or progression of thought 	4–5
<ul style="list-style-type: none"> • Recalls relevant information on human activities in the oceans and/or biological resources and/or the impact of human activities on the oceans • Uses some appropriate terminology and/or progression of thought 	2–3
<ul style="list-style-type: none"> • Recalls some relevant information 	1

Earth and Environmental Science

2011 HSC Examination Mapping Grid

Section I
Part A

Question	Marks	Content	Syllabus outcomes
1	1	9.2.2.2.1	H7
2	1	9.2.1.2.3	H7
3	1	9.2.3.2.1, 9.2.3.3.1	H7
4	1	9.2.5.2.1	H7
5	1	9.2.3.2.2	H8
6	1	9.2.4.2.4, 9.2.4.2.7, 9.1.14.1a, 9.1.14.1g	H7, H14
7	1	9.2.4.2.1, 9.2.1.2.2	H7
8	1	9.3.1.2.2	H7
9	1	9.3.2.3.1, 9.3.4.3.1	H7
10	1	9.3.2.2.1	H7
11	1	9.3.2.2.3	H7
12	1	9.3.3.2.1, 9.1.14.1f	H7, H14
13	1	9.3.4.2.1, 9.3.4.2.3	H7
14	1	9.4.1.3.1	H7
15	1	9.4.6.2.4, 9.4.6.3.4	H9
16	1	9.1.14.1a/c, 9.4.3.2.2	H14
17	1	9.4.6.3.1	H7
18	1	9.4.6.2.1, 9.4.6.3.2, 9.1.14.1c/e	H14
19	1	9.4.6.2.2	H7
20	1	9.4.7.2.1	H7

Section I
Part B

Question	Marks	Content	Syllabus outcomes
21(a)	1	9.2.1.2.1	H7
21(b)	3	9.2.1.2.1	H7
22(a)(i)	1	9.2.1.2.2, 9.1.14.1f	H8, H14
22(a)(ii)	1	9.2.1.2.2, 9.2.1.2.3, 9.1.13.1f	H8, H13
22(a)(iii)	1	9.2.1.2.2, 9.2.1.2.3, 9.1.13.1f	H8, H13
22(b)	3	9.2.1.2.3, 9.1.14.1a, c	H2, H7, H14
23	4	9.2.4.2.7	H8
24	3	9.2.4.2.5	H7
25(a)	3	9.3.1.2.3, 9.1.13.1c	H7, H13
25(b)	2	9.3.1.3.2	H7
26(a)	3	9.3.4.2.3, 9.3.4.2.4	H7
26(b)	4	9.3.4.2.3, 9.3.4.2.4	H7

27	5	9.3.5.2.2, 9.3.5.2.4	H8
28	4	9.4.7.2.3	H9
29(a)	1	9.1.12.3	H12
29(b)(i)	2	9.1.12.4d	H12
29(b)(ii)	2	9.1.12.4e	H12
30(a)	2	9.4.3.2.2	H10
30(b)	3	9.4.3.3.1	H10
31	7	9.2, 9.4, 9.1.14.3b	H3, H4, H5, H7, H8, H9, H10, H14

Section II
Question 32 — Introduced Species and the Australian Environment

Question	Marks	Content	Syllabus outcomes
32(a)(i)	2	9.5.3.2.1, 9.5.4.2.1, 9.1.14.1a	H7, H14
32(a)(ii)	2	9.5.4.2.1	H7, H14
32(b)	4	9.5.6.2.2, 9.5.6.3.1	H4
32I	4	9.5.4.3.2	H2, H4
32(d)(i)	2	9.5.1.3.2, 9.1.13.1e	H13
32(d)(ii)	3	9.5.1.3.2, 9.1.14.1c	H14
32(d)(iii)	2	9.1.11.2d	H11
32(e)	6	9.5.1, 9.5.2, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.1.14.3b	H1, H2, H3, H6, H7, H8, H10, H14

Section II
Question 33 — Organic Geology – A non-renewable Resource

Question	Marks	Content	Syllabus outcomes
33(a)(i)	1	9.6.1.2.1	H9
33(a)(ii)	3	9.6.4.2.2	H6, H9
33(b)	4	9.6.3.2.2, 9.1.14.1a	H7, H14
33I	4	9.6.2.2.1, 9.6.2.2.2, 9.6.2.2.4	H7
33(d)(i)	2	9.1.13.1e, 9.6.5.3.1	H13
33(d)(ii)	3	9.1.14.1c	H14
33(d)(iii)	2	9.1.11.2d	H11
33(e)	6	9.6.4, 9.6.5, 9.6.6, 9.1.14.3b	H1, H2, H3, H6, H7, H8, H10, H14

Section II
Question 34 — Mining and the Australian Environment

Question	Marks	Content	Syllabus outcomes
34(a)(i)	1	9.7.1.2.1	H7
34(a)(ii)	3	9.7.1.2.1, 9.7.1.2.2	H7
34(b)	4	9.7.3.2.6	H7
34I	4	9.7.2.2.1, 9.1.14.1a	H9, H10, H14
34(d)(i)	2	9.1.13.1e, 9.7.3.3.3	H13
34(d)(ii)	3	9.1.14.1c	H14
34(d)(iii)	2	9.1.11.2d	H11
34(e)	6	9.7.4.2.5, 9.7.4.2.6, 9.7.5, 9.1.14.3b	H1, H6, H8, H9, H10, H14

Section II**Question 35 — Oceanography**

Question	Marks	Content	Syllabus outcomes
35(a)(i)	1	9.8.5.3.1	H7
35(a)(ii)	3	9.8.6.3.3, 9.8.6.2.5	H7
35(b)	4	9.8.8	H1, H3
35(c)	4	9.8.7, 9.1.14.1a	H7, H8, H14
35(d)(i)	2	9.1.13.1e, 9.8.3.3.3	H13
35(d)(ii)	3	9.1.14.1c	H14
35(d)(iii)	2	12.4, 9.1.11.2d	H11
35(e)	6	9.8.4, 9.8.5, 9.8.8, 9.1.14.3b	H1, H4, H6, H7, H9, H10, H14