BOARD OF STUDIES
NEW SOUTH WALES

2010 HSC Senior Science Marking Guidelines

Section I, Part A

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

Section I, Part B

Question 21 (a)

Criteria	Marks
• Shows how properties of colloids and suspensions are different	2
• Lists properties of colloids AND/OR suspensions	1

Question 21 (b)

Criteria	Marks
• Names the mixture as a colloid	1

Question 21 (c)

Criteria	Marks
• Provides ONE advantage of mayonnaise being a colloid	1

Question 22 (a)

Criteria	Marks
• Identifies the feature that pH measures	1

Question 22 (b)

Criteria	Marks
• Correctly identifies a way of measuring pH in a school laboratory	1

Question 22 (c)

Criteria	Marks
• Outlines the pH of internal and external organs • Provides thorough reasons for them being maintained at those levels • Provides examples of both internal and external organs	5–6
• Identifies the pH of internal and external organs • Provides a basic reason for the pH being maintained • Provides example(s)	3–4
• Identifies the pH of both internal or external organs OR • Identifies a reason for pH to be maintained	2
• Identifies internal OR external organs	1

Question 23 (a)

Criteria	Marks
• Identifies the correct sequence of steps for the dissolution and distribution of medication throughout body	2
• Identifies ONE step OR • Identifies more than ONE step but incorrectly sequenced	1

Question 23 (b)

Criteria	Marks
• Provides disadvantages of using oral medications with a supporting statement for the use of subdermal implants • Provides advantages of using subdermal implants with a supporting statement for the use of subdermal implants	3
• Identifies a disadvantage of using oral medications and supports either statement OR • Identifies an advantage of subdermal implants and supports either statement	2
• Lists advantage(s)/disadvantage(s) of using oral medications OR • Lists advantage(s)/disadvantage(s) of using subdermal implants	1

Question 24 (a)

Criteria	Marks
• Correctly draws and labels cartilage, tendon and muscle on the diagram in correct anatomical position	3–4
• Correctly draws and labels TWO of either cartilage, tendon or muscle on the diagram	2
• Correctly draws and labels ONE of either cartilage, tendon OR muscle on the diagram	1

Question 24 (b)

Criteria	Marks
• Identifies the function of both cartilage and tendons	2
• Identifies a function of either cartilage OR tendons	1

Question 25

Criteria	Marks
• Identifies materials for both parts correctly and provides thorough reason related to each biomaterial	4
• Identifies materials for both parts correctly and provides sound reason related to each biomaterial	3
• Identifies materials for both parts correctly and provides basic reasoning related to each biomaterial	2
• Identifies correct materials OR • Relates ONE property of a biomaterial to its use	1

Question 26

Criteria	Marks
• Demonstrates a thorough knowledge and understanding of properties of energy • Relates how electromagnetic waves are used in technologies for communication and medicine • Gives examples of technologies used in medicine and communication and names the type of energy used • Communicates with coherence and logical progression and includes correct use of scientific terms and ideas	5–6
• Demonstrates a sound knowledge and understanding of properties of energy • Relates how electromagnetic waves are used in technologies for communication and medicine • Gives an example for both medicine and/or communication, naming the type of energy used • Communicates clearly using scientific terms	3–4
• States that technologies use energy in the form of electromagnetic waves • Gives a correct example for medicine/communication, using a named energy form	2
• States that technologies use electromagnetic waves OR • Identifies that electromagnetic waves can be used to carry energy OR • Gives a correct example of a device using a named electromagnetic wave/other energy form	1

Question 27

Criteria	Marks
• Identifies TWO communication devices/technologies • Relates an advantage of using a range of devices to the examples given	4
• Identifies TWO communication devices • Gives ONE advantage of using a range of devices	3
• Identifies a communication device • Gives an advantage of this device OR identifies an application of this device	2
• Identifies a communication device OR • States an advantage of using a communication device	1

Question 28 (a)

Criteria	Marks
• Identifies features of the orbit that cause a satellite to be geostationary	2
• Identifies a feature of the orbit that causes a satellite to be geostationary	1

Question 28 (b)

Criteria	Marks
• Uses a diagram and text to clearly show the relative positions of satellite, Australia and equator	3–4
• Uses a diagram and text to show some of the requirements needed for a geostationary satellite	2
• Provides a correct and relevant statement about the geostationary satellites OR • Provides a diagram which shows ONE feature of geostationary satellite OR • States ONE feature of a geostationary satellite	1

Question 29

Criteria	Marks
• Sketches in general terms FOUR changes to the method that would provide more valid and reliable results	4
• Sketches in general terms THREE changes to improve the method's validity or reliability	3
• Provides TWO changes that would improve reliability and/or validity • Provides a strategy to improve validity	2
• Provides a change for either reliability or validity	1

Question 30

Criteria	Marks
• Demonstrates a thorough knowledge of technological advances that have had an impact on people and society • Makes a judgement on the value of the stated advances • Relates the outcomes of technological advances to maintaining humans as functioning organisms • Provides examples • Communicates with coherence and logical progression and includes correct use of scientific principles and ideas	7–8
• Demonstrates a sound knowledge and understanding of technological advances that have had an impact on people and society • Provides example(s) • Communicates some scientific principles and ideas in a clear manner	5–6
• Demonstrates a basic knowledge of technological advances that have had an impact on people and society • Provides example(s) • Communicates in a basic form, using general scientific terms	3–4
• Demonstrates a limited knowledge of technological advances • Communicates simple ideas	1–2

Section II

Question 31 (a) (i)

Criteria	Marks
• Provides a definition of the term polymerisation	1

Question 31 (a) (ii)

Criteria	Marks
• Names TWO natural polymers and compares their properties	3
• Names TWO natural polymers and compares ONE property	2
• Names ONE natural polymer and outlines a property	1

Question 31 (b) (i)

Criteria	Marks
• States a relevant problem	1

Question 31 (b) (ii)

Criteria	Marks
• Identifies and supports a relevant strategy related to the problem identified in (i)	3
• Identifies a relevant strategy and relates it to the problem identified in (i)	2
• Identifies a relevant strategy	1

Question 31 (c) (i)

Criteria	Marks
• Provides features of the results of a first-hand investigation to identify the effect of temperature on different polymers	2
• Makes a relevant statement about the effect of temperature on polymers	1

Question 31 (c) (ii)

Criteria	Marks
• Identifies potential risks and shows how they would be managed	3
• Identifies a potential risk and shows how it would be managed OR • Identifies TWO potential risks	2
• Identifies a potential risk in the investigation OR • Identifies a method of managing a relevant risk	1

Question 31 (d)

Criteria	Marks
• Demonstrates coherence and logical progression • Describes the contributions of scientific work to society • Differentiates scientific work from social contributions • Makes a statement of value • Refers to given example	4–5
• Describes a contribution of scientific work to society • Refers to given example	2–3
• Makes a relevant statement about example given	1

Question 31 (e)

Criteria	Marks
• Demonstrates thorough knowledge and understanding of plastics and their impacts • Gives examples of several plastics with reference to their properties and uses • Supports clear arguments or conclusions • Communicates with coherence and logical progression and includes correct use of scientific principles and ideas	6–7
• Demonstrates sound knowledge and understanding of plastics • Gives an example of ONE plastic and refers to its properties or the uses of plastics • Communicates some scientific ideas in a clear manner	4–5
• Demonstrates basic knowledge of plastics • Identifies a few properties or uses of plastics • Communicates ideas in a basic form, using general scientific terms	2–3
• Demonstrates a limited knowledge of plastics • Identifies ONE property or ONE use of plastics • Communicates simple ideas	1

Question 32 (a) (i)

Criteria	Marks
• Correctly names an additive that is not a preservative	1

Question 32 (a) (ii)

Criteria	Marks
• Clearly states how roles of preservatives are different to other food additives, giving an example(s)	3
• Identifies the role of preservatives and another food additive	2
• Identifies the role of either a preservative or another food additive	1

Question 32 (b) (i)

Criteria	Marks
• States a relevant problem	1

Question 32 (b) (ii)

Criteria	Marks
• Identifies and supports a strategy related to the problem identified in (i)	3
• Identifies a relevant strategy and relates it to the problem identified in (i)	2
• Identifies a relevant strategy	1

Question 32 (c) (i)

Criteria	Marks
• Provides features of the results of a first-hand investigation to demonstrate the solubilities of nitrates, nitrites and sulfites	2
• Makes a relevant point about nitrates/nitrites or sulfites	1

Question 32 (c) (ii)

Criteria	Marks
• Compares the roles of nitrates, nitrites and sulfites and their use in food as preservatives	3
• Describes the role(s) of nitrates/nitrites and sulfites as preservatives	2
• Makes a relevant point about the role of chemical preservatives in foods	1

Question 32 (d)

Criteria	Marks
• Demonstrates coherence and logical progression • Describes the contributions of scientific work to society • Differentiates scientific work from social contribution • Makes a statement of value • Refers to given example	4–5
• Describes a contribution of scientific work to society • Refers to given example	2–3
• Makes a relevant statement about example given	1

Question 32 (e)

Criteria	Marks
• Demonstrates thorough knowledge and understanding of the need for control and labelling of food additives • Provides relevant examples • Provides a judgement • Communicates with coherence and logical progression and includes correct use of scientific ideas	6–7
• Demonstrates sound knowledge and understanding of the need for control and labelling of food additives • Provides relevant examples • Communicates some scientific ideas in a clear manner	4–5
• Demonstrates a basic knowledge of the need for control and labelling of food additives • Provides example(s) • Communicates in basic form, using general scientific terms	2–3
• Demonstrates a limited knowledge of additives in food • Communicates simple ideas	1

Question 33 (a) (i)

Criteria	Marks
• Names THREE types of blood vessels	2
• Names fewer than THREE types of blood vessels	1

Question 33 (a) (ii)

Criteria	Marks
• Clearly shows the difference in structure AND blood-carrying capacities of two blood vessels	2
• Shows the difference in structure OR blood-carrying capacity of two blood vessels	1

Question 33 (b) (i)

Criteria	Marks
• States a relevant problem	1

Question 33 (b) (ii)

Criteria	Marks
• Identifies and supports a relevant strategy related to the problem identified in (b) (i)	3
• Identifies a relevant strategy and relates it to the problem identified in (b) (i)	2
• Identifies a relevant strategy	1

Question 33 (c) (i)

Criteria	Marks
• Provides features of the results of a first-hand investigation to culture bacteria from everyday surroundings	2
• Makes a relevant statement about culturing bacteria	1

Question 33 (c) (ii)

Criteria	Marks
• Identifies potential risks and shows how they would be managed	3
• Identifies a potential risk and shows how it would be managed OR • Identifies TWO potential risks OR • Identifies TWO management practices	2
• Identifies a potential risk in the investigation OR • Identifies a method of managing a relevant risk	1

Question 33 (d)

Criteria	Marks
• Demonstrates coherence and logical progression • Describes the contributions of scientific work to society • Differentiates scientific work from social contribution • Makes a statement of value • Refers to given example	4–5
• Describes a contribution of scientific work to society • Refers to given example	2–3
• Makes a relevant statement about example given	1

Question 33 (e)

Criteria	Marks
• Demonstrates thorough knowledge and understanding of the nervous system • Relates pain detection and responses to pain through the nervous system • Communicates with coherence and logical progression and includes correct use of scientific terms and ideas	6–7
• Demonstrates sound knowledge and understanding of the nervous system • Relates pain detection and responses to pain through the nervous system • Communicates some scientific ideas in a clear manner	4–5
• Demonstrates a basic knowledge of the nervous system • Communicates ideas in a basic form using general scientific terms	2–3
• Demonstrates a limited knowledge of the nervous system • Communicates simple ideas	1

Question 34 (a) (i)

Criteria	Marks
• Correctly identifies a community organisation active in disaster relief	1

Question 34 (a) (ii)

Criteria	Marks
States the roles of the SES and RFS by: • Including similarities • Including differences	3
• Includes only similarities OR • Includes only differences OR • Includes similarities and differences but is not explicit about roles	2
• Gives a role of the RFS or SES	1

Question 34 (b) (i)

Criteria	Marks
• States a relevant problem relating to safety	1

Question 34 (b) (ii)

Criteria	Marks
• Identifies a relevant strategy related to the problem identified in (i) and includes a supporting statement	3
• Identifies a relevant strategy and relates it to the problem identified in (i)	2
• Identifies a relevant strategy	1

Question 34 (c) (i)

Criteria	Marks
• Provides observations of the results of a first-hand investigation to compare flammability of dry and fresh leaves	2
• Makes a relevant statement about flammability of leaves	1

Question 34 (c) (ii)

Criteria	Marks
• Demonstrates a clear understanding of the application of the results to reduce bushfire risk in rural areas	3
• Provides a basic description of how to reduce risk of bushfire in rural areas, related to results of investigation	2
• States how risk could be reduced with no reference to results	1

Question 34 (d)

Criteria	Marks
• Demonstrates coherence and logical progression • Describes the contributions of scientific work to society • Differentiates scientific work from social contribution • Makes a statement of value • Refers to given example	4–5
• Describes a contribution of scientific work to society • Refers to given example	2–3
• Makes a relevant statement about example given	1

Question 34 (e)

Criteria	Marks
• Demonstrates thorough knowledge and understanding of disasters caused by atmospheric pressure with examples • Provides an explanation of how atmospheric pressure is monitored • Communicates with coherence and logical progression and includes correct use of scientific principles and ideas	6–7
• Demonstrates sound knowledge and understanding of disasters caused by atmospheric pressure with examples • Provides an explanation of how atmospheric pressure is monitored • Communicates some scientific principles and ideas in a clear manner	4–5
• Demonstrates a basic knowledge of disasters caused by atmospheric pressure or monitoring of these disasters • Provides at least ONE example of how atmospheric pressure is monitored • Communicates ideas in a basic form, using general scientific terms	2–3
• Demonstrates a limited knowledge of disasters caused by atmospheric pressure or monitoring of these disasters • Communicates simple ideas	1

Question 35 (a) (i)

Criteria	Marks
• Identifies TWO spin-offs	2
• Identifies a spin-off	1

Question 35 (a) (ii)

Criteria	Marks
• Provides a statement describing original use and current use	2
• Identifies original use or current use	1

Question 35 (b) (i)

Criteria	Marks
• States ONE problem	1

Question 35 (b) (ii)

Criteria	Marks
• Clearly describes ONE strategy and provides support/reason for its effectiveness	3
• Identifies ONE strategy and makes a judgement OR • Describes ONE strategy	2
• Identifies ONE strategy	1

Question 35 (c) (i)

Criteria	Marks
• Provides features of a named system used for human space travel	2
• Identifies a system other than the space shuttle OR • Provides a feature without identifying the system	1

Question 35 (c) (ii)

Criteria	Marks
• Sketches in general terms advantages and disadvantages related to the system in part (i)	3
• Provides an advantage and a disadvantage OR • Provides an advantage/disadvantage and relates it to system from part (i)	2
• Provides an advantage OR a disadvantage	1

Question 35 (d)

Criteria	Marks
• Demonstrates coherence and logical progression • Describes the contributions of scientific work to society • Differentiates scientific work from social contribution • Makes a statement of value • Refers to given example	4–5
• Describes a contribution of scientific work to society • Refers to given example	2–3
• Makes a relevant statement about example given	1

Question 35 (e)

Criteria	Marks
• Demonstrates a thorough knowledge and understanding of the strategies and materials used • Provides relevant examples • Provides a judgement • Communicates with coherence and logical progression and includes correct use of scientific ideas	6–7
• Demonstrates a sound knowledge and understanding of the strategies and materials used • Provides relevant examples • Communicates some scientific ideas in a clear manner	4–5
• Demonstrates a basic knowledge of the strategies and materials used • Provides examples • Communicates in basic form using general scientific terms	2–3
• Demonstrates a limited knowledge of strategies or materials used • Communicates simple ideas	1

Senior Science

2010 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I Part A			
1	1	9.2.1.2.3	H8
2	1	9.2.5.2.2	H9
3	1	9.2.3.2.1	H9
4	1	9.2.1.3.1	H8
5	1	9.2.2.2.5, 9.2.2.2.6	H8
6	1	9.2.4.3.1	H8
7	1	9.4.1.3.1, 9.4.1.2.5	H10
8	1	9.4.1.2.1	H10
9	1	9.4.2.3.1, 9.4.3.2.3	H10
10	1	9.4.5.2.2, 14.1(a), (d), (g)	H10, H14
11	1	9.4.3.2.2	H10
12	1	9.4.1.3.2, 12.3 (c)	H10, H12
13	1	11.2(c), (d)	H11
14	1	9.2.1.3.4, 9.2.1.2.4	H8
15	1	9.3.4.2.5	H9
16	1	9.3.4.2.1	H9
17	1	9.3.2.2.1	H9
18	1	9.3.2.3.2	H9
19	1	12.3(c), 14.1(a)	H7, H9, H12, H14
20	1	9.3.4.3.2, 12.3(c), 12.4(b)	H7, H9, H12
Section I Part B			
21 (a)	2	9.2.1.2.3	H8
21 (b)	1	9.2.1.2.2, 9.2.1.2.3	H8
21 (c)	1	9.2.1.3.2	H8
22 (a)	1	9.2.3.2.3	H8
22 (b)	1	9.2.3.3.2	H8
22 (c)	6	9.2.3.2.4, 9.2.5.2.3	H7, H8, H9
23 (a)	2	9.2.4.3.2, 13.1(e)	H8, H13
23 (b)	3	9.2.5, 9.2.4.3.2	H9
24 (a)	4	9.3.3.3.2, 13.1	H9, H13
24 (b)	2	9.3.3.3.2, 9.3.3.2.2	H9
25	4	9.3.3.2.6, 9.3.3.2.8, 12.3(c), 14.1(a), (b), (c)	H8, H12, H14
26	6	9.3.5.2.2, 9.4.3.2.2, 9.4.3.2.3, 14.3b	H3, H10, H14
27	4	9.4.1.2.6	H10
28 (a)	2	9.4.4.2.1	H10

Question	Marks	Content	Syllabus outcomes
28 (b)	4	9.4.4.2.2, 13.1(e)	H10, H13
29	4	9.4.3.3.1, 12.1(a)	H10, H12
30	8	9.3.1, 14.3(b)	H4, H9, H14
Section II **Question 31 — Polymers**			
(a) (i)	1	9.5.1.2.1	H8
(a) (ii)	3	9.5.1.2.4	H8
(b) (i)	1	14.1(a), 14.2(a)	H14
(b) (ii)	3	9.5.4.2.4, 9.5.4.3.2, 9.5.4.3.3, 14.2(b), (d), 14.3	H6, H8, H14
(c) (i)	2	9.5.2.3.1, 12.2(b)	H8, H12
(c) (ii)	3	11.3(b), 12.1(b), (d)	H8, H11, H12
(d)	5	9.5	H3, H4, H8
(e)	7	9.5.3.2.4, 14.3(b)	H4, H8, H14
Section II **Question 32 — Preservatives and Additives**			
(a) (i)	1	9.6.2.2.4	H8
(a) (ii)	3	9.6.2.2.4	H8
(b) (i)	1	114.1(a), 14.2(a)	H14
(b) (ii)	3	9.6.2.2.2, 9.6.2.3.1, 9.6.3.2.2, 14.2(b), (d), 14.3	H7, H14
(c) (i)	2	9.6.2.3.2, 12.2(b)	H8, H12
(c) (ii)	3	9.6.2.3.2, 9.6.2.2.3, 14.1(c)	H8, H14
(d)	5	9.6	H3, H4, H8
(e)	7	9.6.5.2.4, 9.6.5.3.1, 9.6.5.3.2, 14.3(b)	H4, H8, H14
Section II **Question 33 — Pharmaceuticals**			
(a) (i)	2	9.7.2.2.2	H9
(a) (ii)	2	9.7.2.2.2	H9
(b) (i)	1	14.1(a), 14.2(a)	H14
(b) (ii)	3	9.7.4.2.6, 14.2(b), (d), 14.3	H7, H8, H14
(c) (i)	2	19.7.4.3.3, 12.2(b)	H12
(c) (ii)	3	9.7.4.3.3, 11.3(b), 12.1(b), (d)	H11, H12
(d)	5	9.7	H3, H4, H8
(e)	7	9.7.1, 9.7.3.2.5, 9.7.3.2.7, 14.3(b)	H7, H9, H14
Section II **Question 34 — Disasters**			
(a) (i)	1	9.8.5.3.1, 9.8.5.2.1	H4
(a) (ii)	3	9.8.5.3.1, 9.8.5.2.1	H4
(b) (i)	1	14.1(a), 14.2(a)	H12
(b) (ii)	3	9.8.4.3.3, 14.2(b), (d), 14.3	H14
(c) (i)	2	9.8.3.3.6, 12.2(b)	H8, H12
(c) (ii)	3	9.8.3.2.8, 9.8.3.2.5, 9.8.3.3.5, 14.1(c)	H10, H14
(d)	5	9.8, 12.3(e), 14.1(e)	H3, H12, H14

Question	Marks	Content	Syllabus outcomes
(e)	7	9.8.2, 14.3(b)	H4, H14
Section II **Question 35 — Space Science**			
(a) (i)	2	9.9.6.2.2	H4
(a) (ii)	2	9.9.6.2.2	H3, H4
(b) (i)	1	12.3(c)	H12
(b) (ii)	3	9.9.3.2.6, 9.9.3.3.1, 14.2(b)	H14
(c) (i)	2	9.9.4.3.1	H3, H6
(c) (ii)	3	9.9.4.3.1	H3, H6
(d)	5	9.9, 12.3(e), 14.1(e)	H3, H4, H12
(e)	7	9.9.3, 9.9.4, 14.3(b)	H3, H3, H8, H14