2005 HSC Notes from the Marking Centre Senior Science

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2005 HSC NOTES FROM THE MARKING CENTRE SENIOR SCIENCE

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Senior Science. It provides comments with regard to responses to the 2005 Higher School Certificate examination, indicating the quality of candidate responses and highlighting the relative strengths and weaknesses of the candidature in each section and each question.

This document should be read along with the relevant syllabus, the 2005 Higher School Certificate examination, the marking guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Senior Science.

General Comments

In 2005, 13217 candidates attempted the Senior Science examination. The most popular electives were Disasters (67%) and Pharmaceuticals (13%).

Teachers and candidates should be aware that examiners may write questions that address the syllabus outcomes in a manner that requires candidates to respond by integrating their knowledge, understanding and skills developed through studying the course, including the Prescribed Focus Areas. This reflects the fact that the knowledge, understanding and skills developed through the study of discrete sections should accumulate to a more comprehensive understanding than may be described in each section separately. It is important to understand that the Preliminary HSC course is assumed knowledge for the HSC course.

In 2005, at least one question in Section 1 Part B focused on the mandatory skills content in Module 9.1. Candidates who had actively planned and performed practical experiences clearly demonstrated a deeper knowledge and understanding of the content described in this module. There was evidence that some candidates had a very poor knowledge of basic definitions specific to terminology associated with the course.

Overall, the candidate's responses were appropriate and indicated a level of understanding of Senior Science concepts appropriate for most HSC candidates. Candidates need to be reminded that the answer space provided and the marks allocated are guides to the maximum length of response required. Similarly, the key word used in the question gives an indication of the depth of the required response. Candidates should use examination time to analyse the question and plan responses carefully, working within that framework to produce clear and concise responses. This may include the use of dot points, diagrams and/or tables, and avoids internal contradictions. This is particularly so in holistic questions which need to be logical and well-structured.

Better responses indicate that candidates are following the instructions provided on the examination paper. In these responses, candidates:

- show all working where required by the question
- do not repeat the question as part of the response

- look at the structure of the whole question and note that in some questions the parts follow from each other ie responses in part (a) lead to the required response in part (b) etc
- use appropriate equipment, for example, pencils and a ruler to draw diagrams and graphs. (A clear plastic ruler would aid candidates to plot points that are further from the axes and rule straight lines of best fit.)

The option question is divided into a number of parts: candidates should clearly label each part of the question when writing in their answer booklets. In part (c), many candidates wrote a lot of information that was not relevant to the question. Some responses show evidence of rote learning an anticipated answer based on a single source. These did not address the syllabus content and/or outcomes being assessed and hence did not score full marks. Some candidates are responding to more than one option question: candidates are strongly advised to answer the option they have studied in class.

Section I – Core

Part A – Multiple Choice

Question	Correct Response
1	D
2	B
3	C
4	B
5	A
6	B
7	C
8	A
9	A
10	D
11	B
12	D
13	C
14	A
15	C

Part B

Specific Comments

Questions 16

(a) Most candidates identified two roles of the skin.

(b) (i) Many responses were able to state the two solvents given in the result table.

(ii) Better responses were able to show understanding of the properties of a colloid, and to relate this to information given in the question. Most candidates used the data table to make a correct statement about the solubility of ingredient 1, or then indicated that ingredient 1 did not settle out. Weaker responses were unable to relate information given in the question to any property of a colloid.

Question 17

Better responses were able to state a definition of the concept of biodegradability as being a natural process involving the breakdown of detergents and many were able to link this to a more specific effect on non-biodegradability. A large majority of candidates were able to make a general statement connected to the concept of biodegradability. Weaker responses included only a definition or the general features of biodegradability.

Question 18

(a) (i) The majority of responses identified a variable that needed to be controlled, but a significant number confused the independent variable that had been changed with a variable that had been held constant.

(ii) A significant number of responses demonstrated a clear understanding of the role of enteric tablets or correctly interpreted data from the table. Stronger responses linked information from the table to their knowledge of the structure and function of enteric coated tablets in the body.

(b) Better responses clearly described the functions of both the stomach and the small intestine whilst superior responses clearly linked the pH of both organs to the functions of these organs. A significant number of responses correctly identified the pH of both the stomach and the small intestine; however, some confused high pH with high acidity.

Question 19

Superior responses showed evidence of wider knowledge of this part of the syllabus.
A majority of responses identified some roles of water as a solvent or provided properties of water as a solvent. Many responses outlined general properties or roles of water which did not relate to water as a solvent. Better responses described roles and properties for both internal and external environments and related specific solvent properties of water to specific functions of named organs, both internally and externally. These provided examples to illustrate each property mentioned.

Question 20

(a) A majority of responses successfully stated an aim for the investigation.

(b) The majority of candidates was able to identify a safe work practice and clarify it with an example. Better responses provided reasons for a safe work practice.

(c) Better responses were able to clearly relate the effect acid would have on calcium in bone. Weaker responses provided physical properties of bone.

Question 21

(a) Most responses included an impact on society of either ‘heart transplant’ or ‘artificial hearts’. Better responses were able to clearly state three impacts while weaker responses stated less than three.

(b) Better responses were able to link technological advance to the improvement and provide supporting statements. Weaker responses only named improvements in or a technological advance in pacemakers.

Question 22

(a) Most responses incorrectly identified the part labeled X as 'bronchial tube', instead of 'bronchus'.

(b) Most responses named the trachea as part of the windpipe/an 'air tube', but did not state its function.

(c) Better responses included a description of the alveoli. These were able to identify the feature that allowed for efficient gaseous exchange.

Question 23

(a) Most responses identified a minimally invasive medical technique. Weaker responses identified non-invasive techniques, eg X rays.

(b) Many responses included a description of how MRI works though some confused MRI with ultra sound and thermography.

Question 24

(a) Better responses presented a correct sequence of energy changes with direction indicated by arrows.

(b) Better responses included a good description of the process of digital coding, clearly relating this to the impact upon the development of communication technologies.

Question 25

(a) Better responses had all cells in the table correctly completed with numerical or written values and correct units.

(b) Better responses explained that bandwidth and transition time were the key factors in the faster transmission rate for optic fibres.

Questions 26

Better responses clearly identified one correct advantage and one correct disadvantage of radio waves supported by a reason for each.

Question 27

Better responses outlined a valid direction of research into future telecommunications and included reasons for the choice of the future direction. Weaker responses outlined a direction of research without supporting reasons to justify their choice.

Section II – Options

Question 28 – Polymers

(a) (i) Most responses identified the essential difference between first hand and second hand investigations, although few identified a second, *independent* difference.

(ii) Better responses stated the physical behaviour you could expect from these two plastics and then showed a knowledge of plastics to explain their predictions. Weaker responses confused 'thermosetting' with 'thermoplastic' and/or made an incorrect prediction of the result.

(b) (i) Weaker responses failed to address 'downcycling'.

(ii) The better responses were able to identify both positive and negative aspects of recycling. They made a judgement on the viability of recycling in terms of economic, social and ecological consequences.
Weaker responses merely gave facts about recycling.

(c) Better responses clearly linked the use of synthetic polymers to their specific properties, identified and made a judgement about an impact on society of named polymers in terms of their uses. Weaker responses failed to link the uses of the polymers to their properties and omitted any social consequences.

(d) (i) Most candidates achieved full marks for this question. Diagrams were well set out and clearly labelled.

(ii) The best responses clearly stated that they averaged their results to increase reliability. The majority of responses incorrectly stated they averaged results to increase the accuracy.

(iii) The best responses identified three conclusions and gave relevant data to support their choices. Most responses identified at least two of the possible conclusions.

Question 29 – Preservatives and Additives

(a) (i) Most responses identified the essential difference between first hand and second hand investigations, although few identified a second, *independent* difference.

(ii) Most candidates understood that the sultanas became swollen because of the uptake of water. Better responses used diagrams that included a concentration gradient to describe the process and relate it to the swelling of the sultanas. Weaker responses described the sultanas as dissolving.

(b) (i) Candidates were able to identify the preservative agents as vinegar, sugar and refrigeration. Many did not support their answer by explaining the effect of the method on micro-organisms. Better responses linked the two methods by explaining how they worked together as preservatives.

(ii) Better responses linked the preservation techniques not only to the cultural aspects of the society but also to the prevailing climatic and economic factors within that society.

(c) Most responses described several advantages and disadvantages of both preservatives and additives. Some incorrectly identified products such as canned foods as containing large amounts of preservatives, showing that they misunderstood the role of preservatives. The link between the use of additives and the effects on society was often weak and the issues identified were often discussed at a superficial level only. Better responses were able to distinguish preservatives as a sub-class of additives and then made a judgement about the impact on society of their use.

(d) (i) Most responses identified sugar as the natural preservative in home made jams. Better responses were able to describe its function.

(ii) Most responses correctly described the use of sterilisation to reduce the microbial load of the jar to prevent contamination of the 'sterile jam'. They also understood the need for prompt sealing to prevent recontamination from bacteria in the air. Better responses included the role of prompt sealing in developing an internal vacuum and the creation of an airtight seal as the jam cools to support their answer.

(iii) All responses indicated that the role of the potassium metabisulfite was to make the jam 'last longer' but some were unable to say why commercial jams would need greater protection than homemade jams.

Question 30 – Pharmaceuticals

(a) (i) Most responses identified the essential difference between first hand and second hand investigations, although few identified a second, *independent* difference.

(ii) Generally well answered. Most candidates correctly identified X as a white blood cell and correctly described its role.

(b) (i) Most responses included a table with structure and function columns and identified at least one correct feature for most of the cells in the table.

(ii) The majority of responses correctly identified the roles of the digestive and circulatory systems and described how the two systems acted together to transport pharmaceuticals around the body.

(c) In general, the standard of response to this part of the question was poor.
Better responses described the contributions of two of the named scientists and related their contributions to our current understanding of disease caused by bacteria. In particular, those candidates who chose Koch were able to state his postulates and clearly describe their significance in the treatment of bacterial diseases today. The significance of Pasteur's work in disproving the theory of 'spontaneous generation' and the subsequent formulation of his 'germ' theory was also well explained in the best responses.

(d) (i) Most candidates were able to describe one or more actions of aspirin in relieving pain.

(ii) This part was not answered well. The better responses include a flow diagram showing a sequence of (usually boxed) steps 'flowing' in a direction indicated by arrows. Weaker responses merely provided information on the role of prostaglandins in promoting inflammation.

(iii) In general, this part was well answered.
Most candidates correctly identified the cause as 'infection' or 'bacteria' and were able to give a reason for at least one of the physiological responses. Weaker responses failed to address all of the physiological responses.

Question 31 - Disasters

(a) (i) Most responses identified the essential difference between first hand and second hand investigations, although few identified a second, *independent* difference.

(ii) Some of the weaker responses referred to disasters that did not occur in Australia.

(b) (i) The question was well answered by many candidates. Weak responses calculated the difference in air pressure of the isobars on the synoptic chart.

(ii) Better responses clearly explained the reasoning behind the forecast and correctly related the movements and features of pressure systems to the forecast.

(iii) Weaker responses identified instruments to monitor clouds but did not explain how they improved our ability to monitor and predict weather patterns.

(c) Better responses generally used a number of Australian disasters as examples, providing clear links between the things people have done or failed to do that have made disasters worse and the specific effects on both people and the environment.
Weaker responses simply provided lists of effects or lists of things people have or have not done to make disasters worse.

(d) (i) Weaker responses only provided general or inaccurate information on the use of seismographs.

(ii) Better responses showed all working for each step and accurately located the epicentre. Weaker responses showed little working or working for only some steps and were unable to locate the epicentre accurately.

Question 32 – Space Science

(a) (i) Most responses identified the essential difference between first hand and second hand investigations, although few identified a second, *independent* difference.

(ii) Many candidates were able to correctly draw and label diagrams that compared and modelled particle distribution in solids/gases in space and on Earth. Weaker responses did not consistently represent the size of the particles.

(b) (i) This question was generally well answered. Better responses suggested a reason and provided an appropriate supporting statement.

(ii) Many candidates were able to identify one or two methods used to probe space. Better responses were able to identify characteristics of each method and the type of information collected.

(c) Most candidates were able to identify some problems faced by long term space travellers. Many were able to outline the problem further by examining the cause, effect and solutions possible for a long term trip. Better responses were able to clearly articulate the problems faced in long term travel and consider the solutions in order to make a judgement about feasibility.

(d) (i) Better responses clearly recognised the conditions of re-entry which linked to the available data. Most stated that heat is generated but failed to recognise aspects of the data which linked to this.

(ii) Better responses identified the conditions and specified the materials and their properties used to manage these conditions. Weaker responses named materials/structures eg tiles, without linking them to re-entry conditions.

(iii) Many candidates were able to identify the role(s) of Voyager 1. Better responses were able to explain how structural features differed between the Space Shuttle and Voyager 1, and linked structural differences to the role of each craft.

Senior Science

2005 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I, Part A			
1	1	9.2.5 C2 dp1; 9.3.4 C2 dp1	H9, H12.3(c)
2	1	9.2.1 C2 dp3	H8
3	1	9.2.5 C2 dp7	H8, H14.1(a)
4	1	9.2.4, C3 dp2; 9.2.5 C2dp5	H7, H8
5	1	9.2.1 C3 dp5	H8
6	1	9.3.1 C2 dp1	H7, H9
7	1	9.3.1 C2 dp1; 9.3.2 C2dp7; 9.3.3 C2 dp6	H9
8	1	9.3.4 C3 dp3 9.3.4 C2 dp5	H9
9	1	9.3.2 C3 dp2	H9
10	1	9.3.4 C3 dp1	H9
11	1	9.4.6 C1dp1; C3dp1	H10
12	1	9.4.1 C2 dp3	H10
13	1	9.4.2 C2 dp2; 9.4.3 C2 dp2	H10
14	1	9.4.2 C3 dp1; 9.4.2 C2dp1	H10
15	1	9.4.4 C2 dp2	H10, H14.1
Section I, Part B			
16 (a)	2	9.9.5 C2 dp1	H9
16 (b) (i)	1	9.2.1 C2 dp3; 9.2.4 C2 dp1	H8
16 (b) (ii)	2	9.2.1 C2 dp3; 9.2.4 C2 dp1; 9.2.4 C2 dp2	H8
17	3	9.2.2 C2 dp5; 9.2.2 C2 dp6	H8
18 (a) (i)	1	9.2.4 C3 dp1	H8, H11, H12
18 (a) (ii)	2	9.2.4 C3 dp1	H8, H11, H14
18 (b)	3	9.2.5 C2 dp2; 9.2.5 C2 dp3	H9, H14
19	6	9.2 (whole module)	H7, H8, H14

Question	Marks	Content	Syllabus outcomes
20 (a)	1	9.3.3 C3 dp1	H9, H14
20 (b)	1	9.3.3 C3 dp1	H9, H11
20 (c)	2	9.3.3 C3 dp1; 9.3.3 C2 dp1	H9, H14
21 (a)	3	9.3.2 C3 dp5	H3, H9
21 (b)	5	9.3.2 C2 dp1,2; 9.3.2 C3 dp3	H1, H9
22 (a)	1	9.3.4 C2 dp1	H9
22 (b)	1	9.3.4 C2 dp1	H9
22 (c)	2	9.3.4 C2 dp1	H9
23 (a)	1	9.3.5 C3 dp1; 9.3.5 C2 dp1,3	H9
23 (b)	3	9.3.5 C2 dp2; 9.3.5 C3 dp1,dp3	H9
24 (a)	3	9.4.1 C2 dp5; 9.4.5 C3dp1	H10, H13
24 (b)	5	9.4.1 C3 dp2; 9.4.1 C2 dp5 9.4.5 C2 dp3	H3, H10, H14
25 (a)	2	9.4.6 C3 dp2	H10, H12, H13
25 (b)	2	9.4.6 C3 dp2	H10, H14
26	4	9.4.3 C2 dp3	H10
27	4	9.4.1 C3 dp2	H5, H10
Section II **Question 28 Polymers**			
28 (a) (i)	2	9.1	H11, H12
28 (a) (ii)	2	9.5.3 C2 dp2/3, C3 dp1	H8, H14
28 (b) (i)	2	9.5.4 C2 dp4	H8
28 (b) (ii)	4	9.5.4 C3 dp1	H8
28 (c)	7	9.5.2.1	H4, H8
28 (d) (i)	2	9.5.1 C3 dp2	H13
28 (d) (ii)	2	9.5.1 C3 dp2	H11, H12
28 (d) (iii)	4	9.5.1 C3 dp2	H14

Question	Marks	Content	Syllabus outcomes
Section II **Question 29 Preservatives and Additives**			
29 (a) (i)	2	9.1	H11, H12
29 (a) (ii)	2	9.6.3 C3 dp3	H8, H14
29 (b) (i)	3	9.6.2 C2 dp2	H8, H14
29 (b) (ii)	3	9.6.2 C3 dp3	H8, H14
29 (c)	7	9.6.1	H4, H8, H14
29 (d) (i)	2	9.6.3 C3 dp3/C2 dp2 9.6.2 C3 dp3	H8, H12
29 (d) (ii)	3	9.6.2 C2 dp2	H8, H14
29 (d) (iii)	3	9.6.2 C2dp3; 9.6.3 C3 dp2	H8, H14
Question 30 Pharmaceuticals			
30 (a) (i)	2	9.1	H11, H12
30 (a) (ii)	2	9.7.2 C2 dp4/C3 dp2	H9
30 (b) (i)	3	9.7.2 C2 dp2/C3 dp1	H9, H13
30 (b) (ii)	3	9.7.2 C2 dp5	H9
30 (c)	7	9.7.4 C3 dp1	H1, H2, H14
30 (d) (i)	2	9.7.3 C2 dp6/7	H7, H9
30 (d) (ii)	2	9.7.3 C3 dp1/C2dp3	H9, H13
30 (d) (iii)	4	9.7.3 C3 dp1	H7, H9, H12, H14
Question 31 Disasters			
31 (a) (i)	2	9.1	H11, H12
31 (a) (ii)	2	9.8.1 C3 dp2	H10
31 (b) (i)	1	9.8.2 C2 dp2	H6, H14
31 (b) (ii)	2	9.8.2 C3dp2/Cdp1	H6, H14
31 (b) (iii)	3	9.8.2 C2dp5/6	H6
31 (c)	7	9.8.1, 9.8.5	H4, H6, H14
31 (d) (i)	2	9.8.3 C3dp2	H10, H14
31 (d) (ii)	6	9.8.3 C3dp1/C2dp3	H10, H12, H13, H14

Question	Marks	Content	Syllabus outcomes
Question 32 Space Science			
32 (a) (i)	2	9.1	H11, H12
32 (a) (ii)	2	9.9.1 C3 dp1/C2 dp1	H6, H13
32 (b) (i)	2	9.9.2 C3 dp1	H5
32 (b) (ii)	4	9.9.5 C2 dp5, dp3; C3 dp2, dp3	H5, H6
32 (c)	7	9.9.3, 9.9.5 C2dp1	H2, H5, H14
32 (d) (i)	2	9.9.4 C2 dp2	H10, H12, H14
32 (d) (ii)	2	9.9.4 C2 dp4	H8, H14
32 (d) (iii)	4	9.9.5 C3 dp1	H8, H12, H14

BOARD OF STUDIES
NEW SOUTH WALES

2005 HSC Senior Science
Marking Guidelines

Section I, Part B

Question 16 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies TWO other roles	2
• Correctly identifies ONE other role	1

Question 16 (b) (i)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Identifies water AND alcohol	1

Question 16 (b) (ii)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Identifies mixture I as a colloid AND • Gives reasons that ingredient I is insoluble AND/OR does not settle out	2
• Identifies mixture I as a colloid OR • Makes a correct statement about the solubility of ingredient I OR • Makes a correct statement that the substance does not settle out	1

Question 17

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Defines biodegradability and links cause to effect of non-biodegradability	3
• Outlines biodegradability and indicates at least one consequence	2
• Makes a correct statement about biodegradability	1

Question 18 (a) (i)

Outcomes assessed: H8, H11, H12

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies ONE controlled variable	1

Question 18 (a) (ii)

Outcomes assessed: H8, H11, H14

MARKING GUIDELINES

Criteria	Marks
• Links information from table to structure and function of enteric coated tablets	2
• Correctly identifies which tablet from the table dissolves quickest in alkali	1

Question 18 (b)

Outcomes assessed: H9, H14

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies pH of each organ and links this with details of the functions of these organs	3
• Describes functions of these organs OR • Identifies pH AND outlines functions	2
• Identifies functions of organs OR • Correct identification of pH	1

Question 19

Outcomes assessed: H7, H8, H14

MARKING GUIDELINES

Criteria	Marks
• Describes properties of water as a solvent • Relates a property to a function of an organ • Uses appropriate examples to illustrate each property mentioned	5–6
• Outlines properties of water as a solvent • Provides some examples	3–4
• Identifies ONE role of water as a solvent • Provides ONE example/property OR • Identifies TWO roles of water OR • Identifies TWO properties of water as a solvent	1–2

Question 20 (a)

Outcomes assessed: H9, H14

MARKING GUIDELINES

Criteria	Marks
• States aim for this investigation	1

Question 20 (b)

Outcomes assessed: H9, H11

MARKING GUIDELINES

Criteria	Marks
• Provides reason for an identified safe work practice	1

Question 20 (c)

Outcomes assessed: H9, H14

MARKING GUIDELINES

Criteria	Marks
• Clearly links the result of the experiment to the property/function identified	2
• States a result OR states a property/function of bones	1

Question 21 (a)

Outcomes assessed: H3, H9

MARKING GUIDELINES

Criteria	Marks
• Identifies 3 features	3
• Identifies 2 features	2
• Identifies 1 feature	1

Question 21 (b)

Outcomes assessed: H1, H9

MARKING GUIDELINES

Criteria	Marks
• Outlines development of pacemaker • Identifies advances in technology • Demonstrates links	4–5
• Outlines development of pacemaker • Identifies advances in technology	2–3
• Identifies one technological advance	1

Question 22 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Names bronchus	1

Question 22 (b)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• States the function	1

Question 22 (c)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Describes the structure of alveoli AND links structure to function	2
• Describes structure of alveoli OR describes the function of alveoli	1

Question 23 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies technique	1

Question 23 (b)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO issues (advantage or disadvantage) with supporting statements	3
• Identifies ONE issue with at least TWO supporting arguments OR • Identifies TWO issues with limited support	2
• Provides ONE reason for using this non-invasive technique	1

Question 24 (a)

Outcomes assessed: H10, H13

MARKING GUIDELINES

Criteria	Marks
• Flow chart which shows correctly at least TWO energy transfers	3
• Uses flow chart with one correct energy transfer	2
• Constructs flow chart which has arrows showing direction OR • Provides a written statement which correctly identifies energy transfers	1

Question 24 (b)

Outcomes assessed: H3, H10, H14

MARKING GUIDELINES

Criteria	Marks
• Describes digital coding using appropriate terminology and links it to the development of communication technologies	4–5
• Outlines the uses or impacts of digital coding in communication technologies	2–3
• Identifies a use or impact of digital coding in communication technologies OR • Describes digital technology using appropriate terminology	1

Question 25 (a)

Outcomes assessed: H10, H12, H13

MARKING GUIDELINES

Criteria	Marks
• Six boxes completed with units expressed either in every box or in column heading box	2
• Six boxes completed with no units OR • 3–5 boxes completed with or without units	1
• 1–2 boxes completed	0

Question 25 (b)

Outcomes assessed: H10, H14

MARKING GUIDELINES

Criteria	Marks
• Provides two correct reasons	2
• Provides one correct reason	1

Question 26

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Identifies ONE advantage supported by a reason AND • Identifies ONE disadvantage supported by a reason	4
• Combination of ONE advantage, ONE disadvantage and supporting reasons	2–3
• Identifies ONE advantage OR • Identifies ONE disadvantage	1

Question 27

Outcomes assessed: H5, H10

MARKING GUIDELINES

Criteria	Marks
• Presents a valid argument to support and give reasons for their choice of future direction	4
• Outlines choice of direction and gives ONE reason for their choice OR • Identifies a possible direction and gives TWO reasons for their choice	3
• Outlines choice of direction OR • Identifies a possible direction and gives ONE supporting reason	2
• Identifies a possible direction of research into telecommunication	1

Section II

Question 28 (a) (i)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• TWO differences identified	2
• ONE difference identified	1

Question 28 (a) (ii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies a result supported by a statement indicating knowledge of plastics	2
• Identifies a result	1

Question 28 (b) (i)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Correct definition of BOTH	2
• Correct definition of recycling OR downcycling	1

Question 28 (b) (ii)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Provides judgement on viability of recycling plastics with strong supporting argument • Outlines the impact of fire retardants and stabilisers on the recycling of plastics	4
• Range of correct statements with supporting arguments	2–3
• ONE correct statement on the role of additives in plastics OR • ONE correct statement about the recycling of plastics	1

Question 28 (c)

Outcomes assessed: H4, H8

MARKING GUIDELINES

Criteria	Marks
• Identifies issues, providing points for and/or against • Links plastics and their uses to their impact on society • Makes a judgement about this impact	6–7
• Provides some points for and/or against production of particular plastics with respect to their impact on society	4–5
• Links some properties/uses with respect to their impact on society	2–3
• Links ONE use with property OR Relates ONE impact on society with use	1

Question 28 (d) (i)

Outcomes assessed: H13

MARKING GUIDELINES

Criteria	Marks
• Draws a labelled diagram of equipment that could be used to measure the mass needed to break the cotton	2
• Draws a correct diagram	1

Question 28 (d) (ii)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• Gives a reason for reporting results in this way that infers increased reliability	2
• Gives a reason for reporting results as average mass	1

Question 28 (d) (iii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• States THREE conclusions giving reasons for each	4
• States TWO conclusions giving reasons OR • States at least TWO conclusions	2–3
• States ONE conclusion giving a reason	1

Question 29 (a) (i)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• TWO differences identified	2
• ONE difference identified	1

Question 29 (a) (ii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Links relative concentrations to movement of water and swelling of sultana	2
• Links movement of water to swelling	1

Question 29 (b) (i)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Links both methods of preservation to their effect on micro-organisms	3
• Explains an effect of ONE method OR • Identifies the effects of TWO methods	2–3
• Identifies an effect of ONE method	1

Question 29 (b) (ii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Provides features and characteristics of TWO preservation techniques in identified cultures	3
• Identifies TWO preservation techniques used in an identified culture OR • Provides features and characteristics of ONE preservation technique in an identified culture	2
• Identifies ONE preservation technique used in one culture	1

Question 29 (c)

Outcomes assessed: H4, H8, H14

MARKING GUIDELINES

Criteria	Marks
• Makes a judgement on the impact on society of the use of preservatives and additives • Identifies issues and providing supporting arguments	6–7
• Describes issues for the impact of preservatives and additives on society	4–5
• Outlines use of preservatives and additives	2–3
• Gives some examples of preservatives and additives	1

Question 29 (d) (i)

Outcomes assessed: H8, H12

MARKING GUIDELINES

Criteria	Marks
• Identifies preservative and gives characteristics and features of function	2
• Identifies natural preservative	1

Question 29 (d) (ii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Gives reasons for the appropriateness of BOTH strategies with supporting statements	2–3
• One correct statement	1

Question 29 (d) (iii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies issues related to the contamination risks in the preparation of food and gives reasons why artificial preservatives such as metabisulfite, may be needed	3
• Identifies the role of preservatives in food • Identifies a contamination risk in the preparation of food commercially or at home	2
• Makes a correct statement about the role of preservatives in foods OR • Makes a correct statement about the preparation of food commercially or at home	1

Question 30 (a) (i)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• TWO differences identified	2
• ONE difference identified	1

Question 30 (a) (ii)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Describes role of white blood cell	2
• Identifies white blood cell OR • Describes the role	1

Question 30 (b) (i)

Outcomes assessed: H9, H13

MARKING GUIDELINES

Criteria	Marks
• Completely correct	3
• Table + 4 pieces correct information OR • All information correct but no table format	2
• Table + 2 pieces correct information OR • 3 pieces correct information + no table	1

Question 30 (b) (ii)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Provides features and characteristics of digestive system and circulatory system and links them to transport and delivery of substances	3
• Outlines role of circulatory system and digestive system	2
• Identifies role of circulatory system or digestive system	1

Question 30 (c)

Outcomes assessed: H1, H2, H14

MARKING GUIDELINES

Criteria	Marks
• Describes contributions made by named scientists • Identifies and draws out the implications of these contributions • Relates these implications to society's understanding of disease caused by bacteria	6–7
• Describes contributions made by named scientists • Describes some implications of these contributions	4–5
• Outlines contributions made by named scientists	2–3
• Makes a correct statement about society's understanding of disease	1

Question 30 (d) (i)

Outcomes assessed: H9, H7

MARKING GUIDELINES

Criteria	Marks
• Provides features and characteristics of aspirin's ability to relieve pain	2
• Identifies ONE action of aspirin	1

Question 30 (d) (ii)

Outcomes assessed: H9, H13

MARKING GUIDELINES

Criteria	Marks
• Draws flow diagram linking at least 3 steps in the inflammation response	2
• Correctly links 2 aspects of inflammation	1

Question 30 (d) (iii)

Outcomes assessed: H7, H9, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Outlines the cause of the symptoms • Gives reasons for THREE physiological responses	4
• Outlines the cause of the symptoms • Gives reasons for at least ONE physiological response	2–3
• ONE of the above	1

Question 31 (a) (i)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• TWO differences identified	2
• ONE differences identified	1

Question 31 (a) (ii)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO examples and provides a feature or characteristic for each using related Australian information	2
• Identifies ONE example and outlines relevant Australian information OR • Identifies TWO Australian disasters	1

Question 31 (b) (i)

Outcomes assessed: H6, H14

MARKING GUIDELINES

Criteria	Marks
• Correct identification	1

Question 31 (b) (ii)

Outcomes assessed: H6, H14

MARKING GUIDELINES

Criteria	Marks
• Gives TWO correct statements about air movement AND/OR air pressure	2
• Identifies movement of pressure systems OR • Identifies change in isobar patterns	1

Question 31 (b) (iii)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Provides explanation of a method of information gathering and links this to improved monitoring and predicting of weather patterns	3
• Identifies several methods of information gathering OR • Identifies one method and links it to improved monitoring or prediction	2
• Identifies one method of gathering information	1

Question 31 (c)

Outcomes assessed: H4, H6, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies components of Australia natural disaster(s) and provides the links between the cause(s) of the disaster(s) and the effects on the environment and people involved	6–7
• Presents some links between cause and effects on both people and/or environment	4–5
• Identifies the effects of disaster on people and/or environment OR • Identifies the causes of the effects of the disaster OR • Identification of cause and limited effects	2–3
• Identifies impact or cause of natural disaster	1

Question 31 (d) (i)

Outcomes assessed: H10, H14

MARKING GUIDELINES

Criteria	Marks
• Provides characteristics/features of the use of the seismograph	2
• Identifies use of seismograph	1

Question 31 (d) (ii)

Outcomes assessed: H10, H12, H13, H14

MARKING GUIDELINES

Criteria	Marks
• Demonstrates evidence of understanding of the process and accurately locate the epicentre	6
• Demonstrates understanding of more than one step in the process of locating the epicentre	4–5
• Demonstrates understanding of one step in the process of locating the epicentre	2–3
• Accurately traces outline of coastline and cities	1

Question 32 (a) (i)

Outcomes assessed: H11, H12

MARKING GUIDELINES

Criteria	Marks
• TWO differences identified	2
• ONE difference identified	1

Question 32 (a) (ii)

Outcomes assessed: H6, H13

MARKING GUIDELINES

Criteria	Marks
Draws labelled diagrams indicating: • Solid same on Earth and in space AND • Gas distances significantly larger in space	2
• Draws labelled diagrams showing one correct comparison	1

Question 32 (b) (i)

Outcomes assessed: H5

MARKING GUIDELINES

Criteria	Marks
• Supports the reason identified	2
• Identifies one reason	1

Question 32 (b) (ii)

Outcomes assessed: H5, H6

MARKING GUIDELINES

Criteria	Marks
• Provides causes and effects of TWO identified methods	4
• Outlines TWO methods identified	3
• Identifies TWO methods OR • Outlines ONE identified method	2
• Identifies ONE method	1

Question 32 (c)

Outcomes assessed: H2, H5, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies and draws out implications of the problems faced by space travellers, relating these problems to the time of the journey, the needs of the space travellers and reduced gravity • Makes a judgement based on these criteria	6–7
• Describes some problems faced by space travellers relating these problems to the time of the journey, needs of the space travellers or reduced gravity	4–5
• Outlines some problems faced by space travellers	2–3
• Identifies a problem faced by space travellers	1

Question 32 (d) (i)

Outcomes assessed: H10, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Links two pieces of data with conditions experienced	2
• Links one piece of data with conditions experienced	1

Question 32 (d) (ii)

Outcomes assessed: H8, H14

MARKING GUIDELINES

Criteria	Marks
• Correctly links two identified properties to the conditions	2
• Correctly identifies one property	1

Question 32 (d) (iii)

Outcomes assessed: H8, H12, H14

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO differences from the shuttle and provides reasons for these differences, based on the data provided • Relates these differences to its role	4
• Identifies at least ONE difference • Relates its structure to its role	2–3
• Identifies ONE role of Voyager 1	1