2004 HSC Notes from the Marking Centre Senior Science

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2004 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 2004 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.

It is essential for this document to be read in conjunction with the relevant syllabus, the 2004 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 2004, approximately 3982 candidates attempted the Senior Science examination.

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. 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.

Overall, the candidates' responses were appropriate and indicated a level of understanding of Senior Science concepts that is appropriate for HSC candidates. Candidates need to be reminded that the answer space allocated is a guide 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. 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.

Section I – Core

Part A – Multiple Choice

Question	Correct Response
1	C
2	C
3	D
4	A
5	D
6	B
7	C
8	A

Question	Correct Response
9	D
10	B
11	C
12	B
13	D
14	B
15	A

Part B

Specific Comments

Question 16

Most candidates who correctly identified two large groups of chemicals went on to score well in this question. Candidates who chose to use the groups of chemicals identified in the question stem generally scored well. Candidates identifying highly specific chemicals with highly specific uses were not generally able to score maximum marks.

Question 17

The majority of candidates were able to give responses that scored some marks but the correct orientation of the soap molecules relative to the oil droplet was essential for full marks. Some candidates failed to complete the question diagrammatically but were able to provide correct written information.

Question 18

(a) Many candidates had a poor understanding of the pH of skin and the pH scale in general. The role of skin microflora as an agent of skin acidity was not well described. Some responses did not include all three elements listed in the question stem, and thus were unable to access the full range of marks.

(b) The relationship between skin products and skin pH was reasonably well understood. Better responses clearly mentioned the need for compatibility between skin and skin products in order to avoid irritation.

Question 19

(a) This question required candidates to identify the essential ingredients of a colloid and the majority of responses provided these ingredients.

(b) The better responses identified the need to control the amounts of all ingredients other than olive oil. They also identified the need both to measure out different amounts of olive oil and to describe a method of determining which amount of olive oil formed the best colloid.

Few candidates were able to identify all aspects required of a first-hand investigation.

Question 20

(a) A majority of candidates were able to successfully identify all required parts of the digestive system.

(b) Most candidates were able to state the difference in pH values of the stomach and the small intestine, and correctly identify these as acidic or alkaline.

Better responses related these pH levels to the conditions required by specific enzymes, and to the stages of digestion occurring in each organ. Some responses went on to show an understanding of protein digestion and its related enzymes.

Weaker responses incorrectly linked a high pH to acidic conditions or a low pH to alkaline conditions.

Question 21

(a) This question was generally well done. Most candidates showed a good understanding of the effect of plaque on blood flow.

(b) This question required the candidates to describe two techniques used to overcome the effects of plaque build-up in arteries. Better responses clearly described specific procedures such as angioplasty, laser ablation, stents and bypass surgery. Weaker responses only identified the procedure or just described one technique.

Question 22

(a) The question required an understanding of the direction of blood flow throughout the heart. Better responses showed entry and exits points of the blood as well as the correct movement inside the chambers. A significant number of candidates could not correctly label the path taken by the blood.

(b) This question was answered well. The better responses named the valve and its function. Most candidates could relate the valves to preventing the backwards flow of blood.

(c) Most candidates provided some description of the function of each chamber of the heart. Better responses included features such as oxygenated and deoxygenated blood in the chambers, valve movement and blood moving to lungs or body. Most candidates described blood flow from atria to ventricles. This question was capably answered in table form.

Question 23

(a) Most responses were correct. A small percentage of candidates used two letters for each part (i) and (ii) or reversed the labels.

(b) Most responses were correct.

(c) A significant number of candidates stated the properties rather than identifying how the feature made the material a suitable alternative. Some weaker responses included properties that were irrelevant to the function of cartilage (eg lightweight, UV resistant).

Question 24

The significant number of repeated responses in the first two parts of this question indicated that many candidates had not read the whole question before each part was attempted.

(a) Better responses indicated how the reagent was used as well as correctly naming it. A significant number of candidates gave inappropriate responses about model lungs, breathing rates and exercise and combustion practical experiences.

(b) Full mark responses included a concisely written procedure (and/or diagram), an experimental control and reference to the specific comparison to be made in the observations. Responses without a clear procedure were not able to convey an adequate knowledge of control, although many candidates gave correct results for the test, thereby showing an understanding of the investigation.

(c) The best responses linked the use of oxygen from inhaled air, the cellular production of carbon dioxide and the subsequent gaseous exchange leading to the exhalation of an increased concentration of carbon dioxide. Few candidates demonstrated a clear knowledge of the relationship between the concentration of carbon dioxide in exhaled air and the metabolic processes, although most indicated there was a higher concentration of carbon dioxide in the exhaled air. Many responses indicated a misconception that the lungs filtered out the oxygen or made carbon dioxide.

Question 25

(a) This question was well answered. Most candidates identified a property of energy from the electromagnetic spectrum that makes it useful in communication technologies. Incorrect responses simply identified a type of electromagnetic radiation.

(b) Better candidates were able to answer the question by describing the equipment they used, the variables they controlled and how they measured the 'quality' of reception. Weaker responses described results from the experiment or stated characteristics of AM and FM waves.

(c) Most candidates were able to construct a suitable table including a finding about the 'quality' of AM and FM radio waves and write a conclusion consistent with the data.

Question 26

(a) Most responses named a benefit of high-definition digital television.

(b) The question required transferring binary codes of a scanned image from Table 1 to find the corresponding signal amplitudes on Table 2. These amplitudes were then graphed against time. Most candidates identified that digital codes involved amplitudes of 'zero' or 'ones'. Candidates are reminded that time intervals when drawn on a graph are the spaces between adjacent values on the scale. When plotting the graph for this type of data, candidates should be aware that the shape of a digital signal is 'block shaped'.

(c) This part of the question emphasised the transmission of a scanned image and its decoding and reconstruction as a duplicated image. Better responses indicated candidates' understanding of the pulse nature of a digital signal and described the decoding process as 're-forming the original image'. Candidates need to be aware that even though digital coding is referred to as 'zeros' and 'ones', it is 'offs/ons' that are actually transmitted as electrical, light or radio pulses.

Question 27

This question required candidates to correctly identify and locate two communication systems on the timeline provided. Candidates then had to relate the consequences/implications of each system on society. The quality of the responses varied but indicated that many candidates had a good understanding of this section of the course. Some better responses were written in dot-point or table form.

Section II – Options

Question 28 – Polymers

(a) (i) Only about half of the candidates correctly identified the two synthetic polymers.

(ii) Most candidates gave two uses of a polymer but did not relate the uses to the properties of the polymers.

(b) (i) Most of the candidates named only one of the naturally occurring materials.

(ii) (1) Very few candidates correctly identified ethylene as the monomer of polyethylene.
(2) Most candidates identified a use but only described one property of polyethylene.

(c) Better responses clearly drew out and related the benefits and problems in recycling plastic materials that are linked to all three of the factors in the question. Most candidates had a clear knowledge only of the impact of biodegradability and its problems and benefits. Average responses included the points for and against some of the named factors involved in recycling.

(d) (i) Most candidates gave a good account of two named plastics used today. Better responses clearly related the named plastic to its impact on society.

(ii) Most candidates clearly set out the investigation that was performed in the laboratory. Most responses included a description of how the variables were controlled to allow for a single experimental variable. Better responses finished their report with a clear justification of their conclusion from their results.

Question 29 – Preservatives and Additives

(a) (i) This question was generally well answered. Most candidates were able to identify a cause of food spoilage.

(ii) Most candidates clearly identified correct steps and explained why these steps were effective. Weaker responses identified a correct step without explaining its role in the preserving process.

(b) (i) Most candidates were able to identify one other example of a bacterium responsible for food poisoning with only the better responses identifying two.

(ii) Many candidates were able to identify the importance of managing bacterial growth with pH. Few responses linked pH with the lower temperatures present in the absence of pressure-cooking equipment and the heat resistance of *Clostridium botulinum*. Stimulus material was not always referred to or correctly interpreted. Poorer responses wrote in general terms of bacteria and their requirements.

(c) Most candidates were able to provide point(s) supporting the use of codes as an alternative to names on food labels. Better responses identified issues on the points for and/or against. Poorer responses described uses for codes without emphasis on them as an alternative to names.

(d) (i) Most candidates correctly described how salt acted as a preservative. Poor responses incorrectly referred to salt as 'acidic' or simply described its use as a condiment.

(ii) Most responses contained correct calculations for the average time for each sample. Many candidates produced a conclusion that was a restatement of the results. Better responses clearly identified that the average flow rate decreased with the addition of glucose to salt.

(iii) Few responses demonstrated an understanding of a 'fair test'. Many responses referred to aspects of reliability but did not include information about the extent to which the processes measure what is intended. Superior responses identified controls for at least two variables and gave supporting reasons why they were included in the method.

Question 30 – Pharmaceuticals

(a) (i) Most candidates correctly identified both the 'brain and spinal cord' as the structures making up the central nervous system.

(ii) Most candidates correctly identified the role of at least one type of neurone but very few correctly identified all three. Many candidates could not distinguish roles in terms of message (electrical impulse) flow. A significant number of candidates identified the roles in the form of a diagram of a reflex arc.

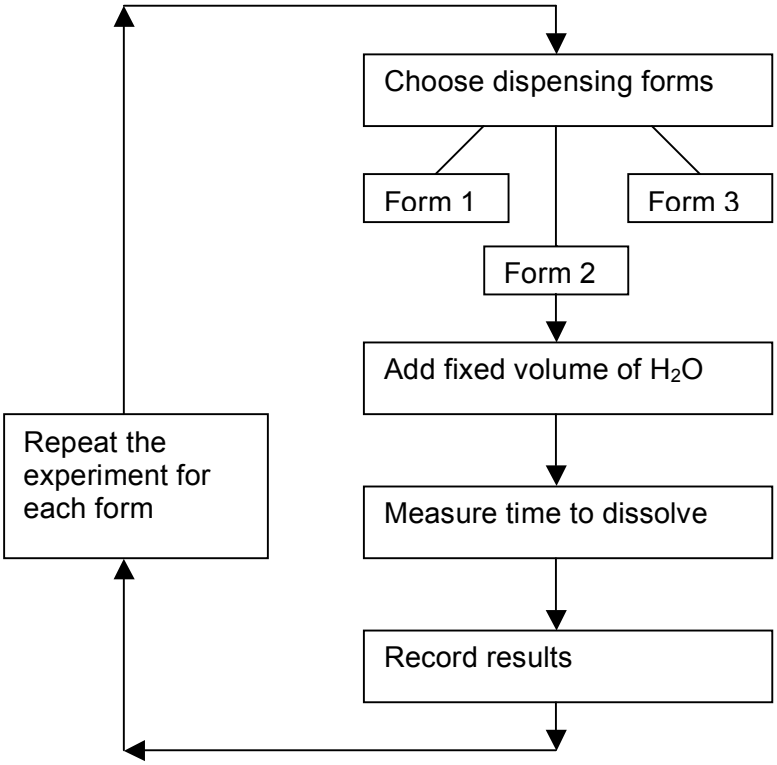
(b) (i) (1) and (2) Most candidates correctly interpreted the graph.

(ii) While most candidates correctly linked the circulatory system to the transport of pharmaceuticals around the body, many did not expand on any issue by providing points for and/or against this form of transport. Vague terms like 'efficient' were often used without any supporting statement.

(c) In general, the standard of response to this question was poor. Many candidates stated how bacteria became resistant to antibiotics without relating any consequences of these antibiotic resistant bacteria on society. When issues were identified they were often described at a superficial level and rarely were relationships made to their impact on society.

(d) (i) Most candidates correctly nominated at least two dispensing forms of analgesic.

(ii) Most candidates illustrated logically sequenced steps for their investigation using a flowchart; however, many of these were poorly constructed, eg lacking arrows and/or including multiple steps at each stage. An example of a good response follows.



(iii) Most candidates stated a conclusion from their results but gave weak judgements about the extent to which the processes and resultant data measure what is intended. While many stated that repetition increased the validity, they did not provide information in support. Many results, and thus conclusions, were overly complex because the investigation included too many variables, eg acidic, basic and neutral solutions.

Question 31 – Disasters

(a) (i) Most candidates correctly identified two emergency services appropriate to the disaster.

(ii) Better responses focused on two relief methods applicable to each service. Weaker responses did not include two relief methods for each service, were not specific as to the relief service, or the relief methods were of too general a nature.

(b) (i) Better responses identified the correct category and provided supporting evidence justifying their choice.

Weaker responses identified the incorrect category or did not supply supporting evidence for their choice.

(ii) Better responses linked the generation of strong winds to:
- heat from warm ocean or fire
- creation of low pressure regions by rising air
- movement of air from high to low pressure
- size of pressure differences and wind strength.

A significant number of candidates adequately explained the generation of winds in cyclones but were unable to explain their formation in bushfires. Weaker responses described the movement of air from high to low pressure, and/or heat producing rising air, without significant reference to cyclones or bushfires or the generation of wind.

c) Many candidates did not distinguish between monitoring and predicting. The better responses discussed difficulties associated with predicting earthquakes and bushfires and identified technologies used to predict and monitor these disasters. The weaker responses stated that predictions are difficult but did not provide points to support their statement.

Most candidates could identify technologies related to predicting and monitoring earthquakes but many candidates were unable to identify technologies appropriate to monitoring and predicting bushfires. Weaker responses referred to conditions linked to the occurrence of bushfires but made no reference to the associated technologies used to monitor them. These candidates frequently described bushfire control measures.

d) (i) (1) Most candidates could describe the method of a first-hand investigation to demonstrate the effect of differences in air pressure. Better responses provided a clearly labelled diagram to support their description or explanation (part 2). Weaker responses did not have a logical sequence of steps. A small but significant number of candidates could not recall an investigation.

(2) Better responses clearly related their observations to air movements resulting from differences in air pressure. Weaker responses described results without an explanation.

(ii) Many candidates stated one technological advance and linked it to its use. Better responses provided characteristics of three technologies and linked them to their uses.

Question 32 – Space Science

(a) (i) Weaker responses failed to distinguish between mass and weight. Many candidates did not explain how increasing mass increased attraction.

(ii) Most candidates were able to identify the gravitational attraction between Earth and Moon.

(b) (i) This was correctly answered by most candidates.

(ii) Most responses identified individual functions of the solid rocket boosters and external propellant tank. Better responses clearly used these functions as a method of comparison, often in a table format. Candidates are reminded that the external tank is simply a fuel supply.

(c) Better responses provided solutions and related these to the implications of a reduced gravity environment on body functions/needs.

(d) (i) Many candidates identified 'spin-offs' but not the source of information. Identification of sources (eg journal article, reference text, reliable website) was often not present or inadequately presented.

(ii) The stimulus material was often used as basis for the answer, instead of 'another' spin-off. Candidates who identified another correct spin-off were usually able to describe impacts, but very few responses included the 'value judgement' on the impact that the spin-off has on society.

(iii) Most candidates made general comments that lacked specificity and/or evidence of relevant research. When issues were identified, many candidates did not provide supporting arguments for or against them to justify whether the space program should continue or not.

Senior Science

2004 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I, Part A			
1	1	9.2.1 C2 dp4; C3 dp 4	H8
2	1	9.2.2 C2 dp4; C2 dp5	H4, H6
3	1	9.2.5 C2 dp5; C2 dp6	H4, H6, H8
4	1	9.2.3, C2 dp5	H8
5	1	9.2.4 C2 dp3	H7, H8
6	1	9.3.1 C2 dp1	H3, H7, H8
7	1	9.3.2 C2 dp4	H3, H7, H9
8	1	9.3.3 C2 dp3	H9
9	1	9.3.4 C2 dp2	H7, H9
10	1	9.3.5 C2 dp2, C3 dp1	H3, H7, H9, H11.3
11	1	9.4.1 C2 dp5 C2 dp1	H10, H12
12	1	9.4.2 C2 dp1	H10
13	1	9.4.4 C2 dp2	H3, H6, H10
14	1	9.4.3 C2 dp3	H3, H10, H14
15	1	9.4.6 C2 dp2; C2 dp3	H3, H10
Section I, Part B			
16	4	9.2.1 C3 dp1	H8
17	2	9.2.1 C2 dp5	H8
18(a)	3	9.2.3 C2 dp4	H7, H8
18(b)	2	9.2.3 C1	H7, H8
19(a)	1	9.2.1 C2 dp3	H8
19(b)	3	9.2.1 C3 dp3	H11
20(a)	2	9.2.5 C2 dp1	H.9
20 (b)	3	9.2.5 C2 dp2 and dp3	H7, H9

Question	Marks	Content	Syllabus outcomes
21(a)	1	9.3.2 C2 dp8	H7, H9
21(b)	2	9.3.3 C2 dp9	H3, H9
22(a)	1	9.3.2 C2 dp1	H9
22 (b)	1	9.3.2 C2 dp1	H9
22(c)	4	C1	H9
23(a)	1	9.3.3 C2 dp3	H9
23(b)	1	9.3.3 C2 dp2	H9
23(c)	3	9.3.3 C2 dp6	H3, H8, H9
24(a)	1	9.3.4 C3 dp2	H8
24(b)	2	9.3.4 C3 dp2	H11
24(c)	3	9.3.4 C3 dp2	H8, H9
25(a)	1	9.4.3 C2 dp2	H10
25(b)	3	9.4.3 C3 dp1	H11
25(c)	4	9.4.3 C3 dp1	H13, H14
26(a)	1	9.4.5 C2 dp3, C3 dp1	H4
26(b)	2	9.4.5 C2 dp3, C3 dp1	H13
26(c)	2	9.4.5 C2 dp3	H10
27	7	9.4.1 C3 dp2	H1, H4, H10, H13
28(a)(i)	1	9.5.1 C2 dp3	H8
28(a)(ii)	3	9.5.2 C2 dp1, C3 dp2, C1	H6, H8
28(b)(i)	2	9.5.2 C2 dp2	H6
28(b)(ii)1	1	9.5.1 C2 dp2, C2 dp1	H8
28(b)(ii)2	3	9.5.3 C2 dp1, C2 dp4	H3, H6, H8
28(c)	7	9.5.4 C2 dp3, C2 dp4	H3, H4, H6, H8
28(d)(i)	3	9.5.3 C2 dp4	H3, H4, H6, H8
28(d)(ii)	5	9.5.3 C3 dp1	H8, H11, H13, H14

Question	Marks	Content	Syllabus outcomes
Section II	**Question 29—Preservatives and Additives**		
29(a)(i)	1	9.6.2 C2 dp2	H3
29(a)(ii)	3	9.6.2 C2 dp2	H3
29(b)(i)	2	9.6.3 C2 dp1	H6
29(b)(ii)	4	9.6.3 C3 dp2	H12
29(c)	7	9.6.5, C2, dp5	H8
29(d)(i)	1	9.6.2 C2 dp2	H8
29(d)(ii)	3	9.6.2 C3 dp5	H14
29(d)(iii)	4	9.6.2 C3 dp5	H11
30(a)(i)	1	9.7.1 C2 dp1	H9
30(a)(ii)	3	9.7.1 C2 dp4	H9
30(b)(i)1	1	9.7.2 C2 dp1, dp5	H12, H14
30(b)(i)2	1	9.7.2 C2 dp1, dp5	H7, H12, H14
30(b)(ii)	4	9.7.2 C2 dp5	H9
30(c)	7	9.7.4 C1 and C2 dp6, dp5	H4, H8
30(d)(i)	1	9.7.3 C3 dp2	H8
30(d)(ii)	3	9.7.3 C3 dp2	H11
30(d)(iii)	4	9.7.3 C3 dp2	H14
31(a)(i)	1	9.8.5 C2 dp1	H4
31(a)(ii)	3	9.8.5 C2 dp1, C3 dp1	H4
31(b)(i)	2	9.8.2 C2 dp3	H14
31(b)(ii)	4	9.8.3 C2 dp6, C3, dp5	H10
31(c)	7	9.8.3 C1, C2 dp4, C2 dp5, C3 dp2 9.8.4 C1	H3, H10
31(d)(i)1	2	9.8.2 C3 dp1	H11
31(d)(i)2	2	9.8.2 C3 dp1, C2 dp2, C3 dp2	H11
31(d)(ii)	4	9.8.2 C2 dp3, C2 dp4, C3 dp5	H14

Question	Marks	Content	Syllabus outcomes
32(a)(i)	1	9.9.2 C2 dp1	H10
32(a)(ii)	3	9.9.2 C2, dp1	H1, H10
32(b)(i)	2	9.9.4 C2, dp2	H10
32(b)(ii)	4	9.9.4 C2 dp1	H6, H10
32(c)	7	9.9.3 C2 (all) and C3 (all)	H4, H7
32(d)(i)	1	9.9.6 C3, dp1	H12
32(d)(ii)	3	9.9.6 C3, dp1	H1, H4
32(d)(iii)	4	9.9.6 C3, dp1	H3, H5

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2004 HSC Senior Science
Marking Guidelines

Section I, Part B

Question 16

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Demonstrates broad knowledge and understanding by selecting correct answers which are different from each other	4
• Selects correct answers with some elements the same	2–3
• Correctly identifies ONE use or safety precaution	1

Question 17

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
Correct orientation of: • Soap in oil drop AND • Water around soap head	2
Either: • Correct orientation of soap in oil drop OR • Correct orientation of water around soap head	1

Question 18 (a)

Outcomes assessed: H7, H8

MARKING GUIDELINES

Criteria	Marks
• Describes THREE factors contributing to pH	3
• Describes TWO factors contributing to pH OR • Describes ONE factor contributing to pH AND • States that skin has acid pH	2
• Identifies ONE factor contributing to pH OR • Statement that skin has acid pH	1

Question 18 (b)

Outcomes assessed: H7, H8

MARKING GUIDELINES

Criteria	Marks
• Describes the relationship and shows the link	2
• Describes the relationship	1

Question 19 (a)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• All THREE of vinegar, olive oil and egg yolk or mustard	1

Question 19 (b)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
Describes a procedure that identifies: • how the independent variable is changed • the need to control the other variables • how the dependent variable is assessed	3
• Any TWO of the above	2
• Any ONE of the above	1

Question 20 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• All FOUR correct	2
• TWO/THREE correct	1

Question 20 (b)

Outcomes assessed: H9, H7

MARKING GUIDELINES

Criteria	Marks
• Relates pH to the digestion of food in the stomach AND small intestine	3
• Relates pH to digestion of food in the stomach OR small intestine OR • Makes correct statement about digestion or pH in the stomach and small intestine	2
• Makes correct statement about digestion OR pH in the stomach OR small intestine	1

Question 21 (a)

Outcomes assessed: H7, H9

MARKING GUIDELINES

Criteria	Marks
• Indicates ONE effect of plaque on blood flow	1

Question 21 (b)

Outcomes assessed: H3, H9

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO techniques and a feature of each technique	2
• Identifies TWO techniques OR • Identifies ONE technique and a feature of that technique	1

Question 22 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Arrows drawn correctly to show the flow of blood through both sides of the heart	1

Question 22 (b)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Provides feature(s) of the function of valve	1

Question 22 (c)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• A function of each of the four chambers of the heart described	4
• A function of some, but not all chambers, described	2–3
• A function of at least ONE chamber correctly described	1

Question 23 (a)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies both structures	1

Question 23 (b)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Correctly names the ball and socket joint	1

Question 23 (c)

Outcomes assessed: H3, H8, H9

MARKING GUIDELINES

Criteria	Marks
• Describes THREE properties that make (UHMWPE) a suitable alternative to cartilage in the joint	3
• Describes TWO properties that make (UHMWPE) a suitable alternative to cartilage in the joint • OR • Identifies THREE properties that make (UHMWPE) a suitable alternative to cartilage in the joint	2
• Describes ONE property that makes (UHMWPE) a suitable alternative to cartilage in the joint OR • Identifies TWO properties that make (UHMWPE) a suitable alternative to cartilage on the joint	1

Question 24 (a)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• One correct test	1

Question 24 (b)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Describes a procedure that identifies – how the concentrations of carbon dioxide were compared AND – that other variables were controlled	2
• Describes a procedure that identifies EITHER how the concentrations of carbon dioxide were compared OR that other variables were controlled	1

Question 24 (c)

Outcomes assessed: H8, H9

MARKING GUIDELINES

Criteria	Marks
• Compares the CO_2 concentration in inhaled and exhaled air • States that CO_2 produced in the body • States that CO_2 is removed from the body through the lungs	3
• Any TWO of the above	2
• Any ONE of the above	1

Question 25 (a)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies one property of energy from the electromagnetic spectrum that makes it useful in communication technologies	1

Question 25 (b)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Describes how the quality was measured AND • Describes the equipment used AND • Describes how the variables were controlled	3
• TWO of the above	2
• ONE of the above	1

Question 25 (c)

Outcomes assessed: H13, H14

MARKING GUIDELINES

Criteria	Marks
• Constructs a table in which the findings can be recorded • Summarises the findings of the investigation on AM and FM • Outlines a conclusion that is consistent with the data	4
• Constructs a table in which the findings can be recorded • Summarises some of the findings of the investigation • Outlines a conclusion that is consistent with some of the data OR • A complete answer but information not given in a table	2–3
• Constructs a table in which the findings can be recorded OR • Presents ONE correct finding of the investigation OR • Outlines a conclusion	1

Question 26 (a)

Outcomes assessed: H4

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies a benefit of digital transmission of television signal	1

Question 26 (b)

Outcomes assessed: H13

MARKING GUIDELINES

Criteria	Marks
• Correctly scales amplitude and time axes of graph grid provided AND • Correctly graphs change in signal amplitude as square wave	2
EITHER • Correctly scales amplitude and time axes OR • Graphs relative differences in signal amplitude along an arbitrary signal determinant axis	1

Question 26 (c)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Identifies that the coded impulses are transmitted • Identifies that the coded impulses are decoded into an image at the receiver	2
• Either ONE of the above	1

Question 27

Outcomes assessed: H1, H4, H10, H13

MARKING GUIDELINES

Criteria	Marks
• Identifies components, draws out and relates implications on society of named communication systems	7
• Discusses impact on society of named communication systems by identifying issues and providing points for and/or against	5–6
• Describes the impacts of the named communication systems AND • Correctly identifies communication systems	3–4
• Describes the impacts of named communication systems OR • Correctly identifies communication system	1–2

Section II

Question 28 (a) (i)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies the TWO synthetic polymers	1

Question 28 (a) (ii)

Outcomes assessed: H6, H8

MARKING GUIDELINES

Criteria	Marks
• TWO uses related to 2 properties	3
• TWO uses related to 1 property OR • TWO uses only	2
• ONE use only	1

Question 28 (b) (i)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• TWO raw materials correctly identified	2
• ONE raw material correctly identified	1

Question 28 (b) (ii) (1)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Correctly identifies monomer	1

Question 28 (b) (ii) (2)

Outcomes assessed: H3, H6, H8

MARKING GUIDELINES

Criteria	Marks
• Identifies a correct use of polyethylene • Relates TWO properties to this use	3
• Use plus ONE property OR • TWO properties	2
• Use only OR • ONE property	1

Question 28 (c)

Outcomes assessed: H3, H8, H6, H4

MARKING GUIDELINES

Criteria	Marks
• Identifies components, draws out and relates benefits and problems involved in recycling plastic materials, linked to the identified factors	7
• Identifies issues and provides points for and/or against the impacts of some of the identified factors on the recycling of plastic materials	5–6
• Provides benefits and problems of recycling plastic materials linked to at least ONE of the identified factors	3–4
• Demonstrates limited knowledge of ONE benefit and/or problem of recycling plastic materials linked to ONE of the identified factors	1–2

Question 28 (d) (i)

Outcomes assessed: H3, H4, H6, H8

MARKING GUIDELINES

Criteria	Marks
• TWO ways AND • TWO or more examples of each way	3
• TWO ways plus one example OR • ONE way plus two examples	2
• ONE way OR • ONE example	1

Question 28 (d) (ii)

Outcomes assessed: H8, H11, H13, H14,

MARKING GUIDELINES

Criteria	Marks
• Clear method (2/3 parts) – identifies controlled and experimental variables • Clear results • Appropriate conclusion stated • Conclusions justified	5
• Clear method – identifies controlled and experimental variables • Clear results • Conclusions stated	3–4
• Clear method, identifies variables OR • Clear result/conclusion stated	2
• Method (only) OR • Result (only)	1

Question 29 (a) (i)

Outcomes assessed: H3

MARKING GUIDELINES

Criteria	Marks
• Identifies ONE cause of food spoilage	1

Question 29 (a) (ii)

Outcomes assessed: H3

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO steps in the process • Explain how each step leads to the successful preservation of food	3
• Identifies TWO steps in the process OR • Identifies ONE step in the process • Explains how this step leads to the successful preservation of food	2
• Identifies ONE step in the process	1

Question 29 (b) (i)

Outcomes assessed: H6

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO bacteria responsible for food poisoning	2
• Identifies ONE bacteria responsible for food poisoning	1

Question 29 (b) (ii)

Outcomes assessed: H12

MARKING GUIDELINES

Criteria	Marks
Provides the following FOUR steps • Identifies that Clostridium botulinum is heat resistant • Identifies that Clostridium botulinum cannot grow at pH 4.5 or below • Identifies that beetroot is a low acid food • Explains why acid is added to beetroot in order to preserve it at home	4
• Any THREE of the above	3
• Any TWO of the above	2
• Any ONE of the above	1

Question 29 (c)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Identifies issues and provides for and/or against the use of Australian Food Standard codes on labels as alternatives to names • Provides a logical and coherent argument using appropriate terminology	6–7
• Identifies TWO issues and provides points for and/or against the use of Australian Food Standard codes on labels as alternatives to names	4 –5
• Identifies TWO issues related to the use of Australian Food Standard codes on labels as alternatives to names OR • Identifies ONE issue and provides points for and/or against the use of Australian Food Standard codes on labels as alternatives to names	2–3
• Identifies ONE issue related to the use of Australian Food Standard codes on labels as alternatives to names	1

Question 29 (d) (i)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Describes how salt acts as a preservative in food	1

Question 29 (d) (ii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Correctly calculates averages • Describes the trend in flow rate • Links the mass of glucose added to the change in flow rate	3
• Any TWO of the above	2
• Any ONE of the above	1

Question 29 (d) (iii)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Identifies at least TWO controlled variables • Justifies why the TWO variables are controlled	4
• Identifies at least TWO controlled variables • Justifies why ONE variable was controlled	3
• Identifies ONE controlled variable • Justifies why ONE variable was controlled OR • Identifies TWO controlled variables	2
• Identifies ONE controlled variable	1

Question 30 (a) (i)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Answer must include both 'Brain' and 'spinal cord'	1

Question 30 (a) (ii)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Identifies roles of THREE neurones	3
• Identifies roles of TWO neurones	2
• Identifies roles of ONE neurone	1

Question 30 (b) (i) (1)

Outcomes assessed: H12, H14

MARKING GUIDELINES

Criteria	Marks
• States that drug will become an (or reach) effective concentration in the blood 1.5 hours after administration OR • Correct response of 1.5 hours	1

Question 30 (b) (i) (2)

Outcomes assessed: H7, H12, H14

MARKING GUIDELINES

Criteria	Marks
• States that drug will remain in effective concentration in blood for 3 hours OR • Correct response of 3 hours	1

Question 30 (b) (ii)

Outcomes assessed: H9

MARKING GUIDELINES

Criteria	Marks
• Identifies issues relating the circulatory system to the transport of pharmaceuticals around the body • Provides points for and/or against	4
• Provides at least ONE issue relating the circulatory system to the transport of pharmaceuticals • Provides points for and/or against	2–3
• Correctly links the circulatory system to the transport of pharmaceuticals	1

Question 30 (c)

Outcomes assessed: H4, H8

MARKING GUIDELINES

Criteria	Marks
• Identifies issues, draws out and relates implications of antibiotic-resistant bacteria on society	6–7
• Identifies issues and provides points for and/or against, arising from the development of antibiotic-resistant bacteria and their impact on society	4–5
• Provides characteristics and features of the uses of antibiotics in society OR • Describes how antibiotic-resistant bacteria develop	2–3
• Identifies relationship between bacteria and antibiotics	1

Question 30 (d) (i)

Outcomes assessed: H8

MARKING GUIDELINES

Criteria	Marks
• Nominates at least TWO dispensing forms of analgesics studied	1

Question 30 (d) (ii)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Identifies steps undertaken during the investigation • Portrays steps in a logically ordered/sequenced flow diagram • Identifies independent variable, and identifies and controls other variables that may influence the investigation • Flowchart shows that the procedure is applied to different dispensing forms	3
• Identifies steps undertaken during the investigation • Either 2 or 3 points above	2
• Identifies steps undertaken during the investigation	1

Question 30 (d) (iii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• States a conclusion for the investigation • Makes a judgement of the validity of conclusion • Provides information to support this judgement	3–4
• States a conclusion for the investigation • Provides a non-substantiated judgement about the validity of the conclusion	2
• States a conclusion for the investigation	1

Question 31 (a) (i)

Outcomes assessed: H4

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO services appropriate to disaster	1

Question 31 (a) (ii)

Outcomes assessed: H4

MARKING GUIDELINES

Criteria	Marks
• Identifies TWO relief procedures correctly linked to each named service	3
• Identifies relief procedures inadequately linked to named service	2
• Identifies some relief procedures	1

Question 31 (b) (i)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Category plus two supporting pieces of evidence	2
• Category plus one supporting piece of evidence	1

Question 31 (b) (ii)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Identifies the source of the wind in both cyclone and bush fire AND • Relates the strength of air movement to particular circumstances in both situations	4
• Demonstrates an understanding of the source of the wind and provides a link to the particular situation	2–3
• General statement about differences in air pressure	1

Question 31 (c)

Outcomes assessed: H3, H10

MARKING GUIDELINES

Criteria	Marks
• Identifies difficulties in predicting both named disasters • Identifies technologies used to monitor both named disasters • Presents a logical, well structured discussion using appropriate terminology	6–7
• Identifies difficulties in predicting both named disasters • Identifies technologies used to monitor both disasters	4–5
• Identifies difficulties in predicting disasters and identifies one technology used to monitor disasters OR • Identifies TWO technologies used to monitor disasters	2-3
• Identifies one difficulty in predicting a disaster, for one disaster OR • Identifies ONE technology used to monitor disasters	1

Question 31 (d) (i) (1)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Logical sequence of steps • Correctly demonstrates effect	2
• Correctly demonstrates effect OR • Logical sequence of steps	1

Question 31 (d) (i) (2)

Outcomes assessed: H11

MARKING GUIDELINES

Criteria	Marks
• Makes general statement indicating that air moved • Give reason for the movement of air	2
• Makes general statement indicating that air moved	1

Question 31 (d) (ii)

Outcomes assessed: H14

MARKING GUIDELINES

Criteria	Marks
• Identifies at least THREE technological advances and links them to their uses OR • Identifies at least TWO technological advances and describes in detail the features of each that make them useful to meteorologists	4
• Identifies at least TWO technological advances and links them to their uses	2–3
• Identifies ONE technological advance and indicates its use to meteorologists OR • Identifies TWO technological advances	1

Question 32 (a) (i)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• A correct relationship shown between mass and gravitational pull	1

Question 32 (a) (ii)

Outcomes assessed: H1, H10

MARKING GUIDELINES

Criteria	Marks
• Explain that there is balance of motion between gravitational pull towards the Earth, and the inertia of the moon (the tendency of the moon to move forward in a straight line)	2–3
• A statement that gravity holds the moon in place OR • A statement that the moon moves with a constant speed	1

Question 32 (b) (i)

Outcomes assessed: H10

MARKING GUIDELINES

Criteria	Marks
• Provides reasons why booster rockets are required during lift off AND • Provides reason why booster rockets are not needed during re-entry	2
• Provides reason why booster rockets are required during lift off OR • Provides reason why booster rockets are not needed during re-entry	1

Question 32 (b) (ii)

Outcomes assessed: H6, H10

MARKING GUIDELINES

Criteria	Marks
• Makes TWO correct comparisons	4
• Makes ONE correct comparison AND • Identifies ONE unrelated function OR • Identifies THREE unrelated functions	3
• Makes ONE correct comparison OR • Identifies TWO unrelated functions	2
• ONE function	

Question 32 (c)

Outcomes assessed: H4, H7

MARKING GUIDELINES

Criteria	Marks
• Identifies issues, draws out and relates implications of reduced gravity environment on body functions/needs	7
• Identifies issues and provides solutions to address the effects of a reduced-gravity environment	5–6
• Provides characteristics and features of problems encountered in low-gravity environment	3–4
• Identifies body functions and needs affected by reduced gravity environment	1–2

Question 32 (d) (i)

Outcomes assessed: H12

MARKING GUIDELINES

Criteria	Marks
• ONE source of information correctly identified	1

Question 32 (d) (ii)

Outcomes assessed: H1, H4

MARKING GUIDELINES

Criteria	Marks
• Identifies ONE spin-off from space research • States the impact on society • Makes a value judgement about the impact that this spin-off has had on society	3
• Identifies one of the 'State' or 'Make'	2
• Identifies one spin-off from space research	1

Question 32 (d) (iii)

Outcomes assessed: H3, H5

MARKING GUIDELINES

Criteria	Marks
• Supports an argument for or against the continuation or discontinuation of the space program • Implies a need for "social conscience" when evaluating costs of space program • Specifies at least TWO issues	3–4
• Any ONE of the above, and • Evidence of relevant research shown	2
• Evidence of relevant research OR • Statement justifying the continuation or ending of the space program	1