

## 2014 HSC Senior Science Marking Guidelines

### Section I, Part A

#### Multiple-choice Answer Key

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

\* Both A and C were accepted because of inconsistency in the data in the table.

## Section I, Part B

### Question 21

Criteria	Marks
• Correctly identifies <i>A</i> , <i>B</i> and <i>C</i>	2
• Correctly identifies one of <i>A</i> , <i>B</i> or <i>C</i>	1

**Sample answer:**

*A*: Sound

*B*: Electrical

*C*: Radio waves or electromagnetic

### Question 22 (a)

Criteria	Marks
• Identifies properties of cement	2
• Identifies a property of cement OR • Any relevant information	1

**Sample answer:**

Cement is inert and biocompatible.

**Answers could also include:**

Strong, composed of long polymer chains, low porosity, forms tight bond with bone.

### Question 22 (b)

Criteria	Marks
• Relates the structure of the artificial joint or procedure involved to bone growth	2
• Any relevant information	1

**Sample answer:**

The artificial hip joint has a rough surface with microscopic pores which allows the patient's bone cells to interweave with the implant.

**Question 22 (c)**

Criteria	Marks
• Sketches in general terms the roles of synovial fluid	2
• Any relevant information	1

**Sample answer:**

Facilitates lubrication, provides shock absorption.

**Question 23 (a)**

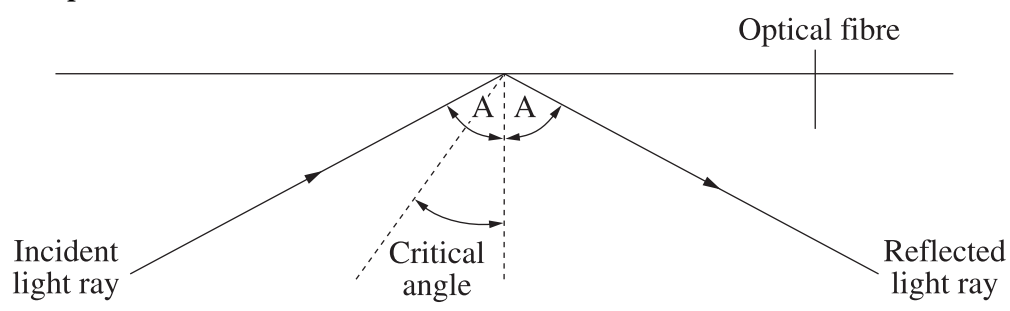
Criteria	Marks
• Identifies benefits of optical fibres in relation to copper	2
• Any relevant information	1

**Sample answer:**

Optical fibres carry data at a greater rate. The cost per megabyte of data is less than for copper wires.

**Question 23 (b)**

Criteria	Marks
• Correct diagram showing incident angle is greater than the critical angle or relative densities	2
• Diagram showing internal reflection	1

**Sample answer:**

**Question 24 (a)**

Criteria	Marks
• Correct observation for each flask	2
• Any relevant information	1

**Sample answer:**

Flask *A* will show oil floating on top of the water  
 Flask *B* will show a homogenous mixture.

**Question 24 (b)**

Criteria	Marks
• Identifies <i>A</i> and <i>B</i>	2
• Identifies <i>A</i> or <i>B</i>	1

**Sample answer:**

*A* – Suspension  
*B* – Emulsion

**Question 24 (c)**

Criteria	Marks
• Puts forward ideas about the effects of non-biodegradable detergents on the environment or organisms	3
• Puts forward an idea about an effect of non-biodegradable detergents on the environment or organisms	2
• Any relevant information	1

**Sample answer:**

If they were not biodegradable, the concentration of detergents would build up and lower the surface tension in streams and lakes, preventing surface dwelling organisms from walking on the water, leading to their deaths.

**Question 25**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Demonstrates a thorough understanding of communication systems</li> <li>• Identifies at least three different systems</li> <li>• Gives the characteristics and features of these systems</li> <li>• Relates the use of the systems to the organisation and presentation of the event</li> <li>• Presents a logical and structured answer</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound understanding of communication systems</li> <li>• Identifies at least two different systems</li> <li>• Gives the characteristics and features of these systems</li> </ul> AND / OR <ul style="list-style-type: none"> <li>• Links the use of the systems to the event</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Outlines feature(s) or use(s) of communication system(s)</li> </ul> OR <ul style="list-style-type: none"> <li>• Outlines general organisation and presentation aspects of this event</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

**Answers could include:**

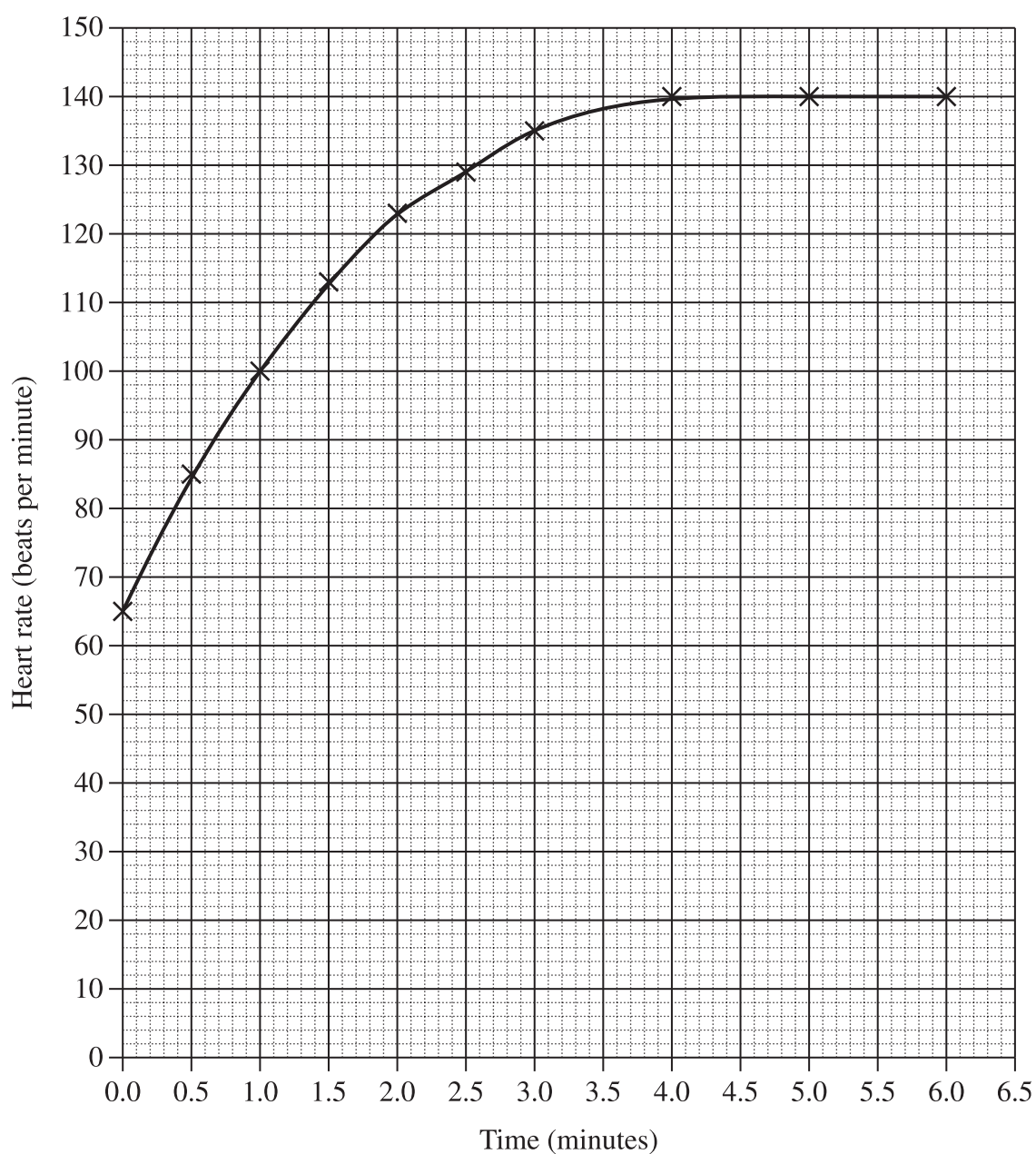
Computer network eg email, Skype™ etc – used to help organise the timing and requirements of the event, bookings. It can be used to store information as well as transmit messages in real time. It can transmit text, sound and images.

Telephone/mobile phone – used to discuss anything urgent or to clarify any issues. It provides instantaneous communication that is necessary prior to and during the telecast. It can also be used to store information as well as transmit messages. Mobile phones can transmit text, sound and images.

Satellite communications – used to send the visual and auditory information from Britain to Australia. Satellite communications produce a slight delay in the transmission. The information is produced in Britain and then bounced off one or more satellites until it reaches Australia.

**Question 26 (a)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Labels quantity on axes, units on axes, appropriate scale on both axes, plots points accurately, draws a line graph with a line of best fit (curved)</li> </ul>	3
<ul style="list-style-type: none"> <li>Plots data accurately, and labels axes with quantities/units or appropriate scale</li> </ul>	2
<ul style="list-style-type: none"> <li>Any type of graph that represents the data or any appropriate labelling on the graph</li> </ul>	1

*Sample answer:*

**Question 26 (b)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Relates the increase in heart rate to the increased metabolic rate</li> <li>Relates the constant heart rate to the metabolic demands having been met</li> </ul>	3
<ul style="list-style-type: none"> <li>Relates any cause and effect to a feature of the graph</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

**Sample answer:**

The heart rate increases initially because the increased use of muscles requires more oxygen and the heart must beat faster to supply more oxygen.

The rate stabilises at 140 bpm because the person is running at a constant speed and the heart reaches a rate that results in a constant and adequate supply of oxygen.

**Question 27**

Criteria	Marks
<ul style="list-style-type: none"> <li>Gives examples and benefits of minimally invasive and non-invasive techniques</li> <li>Relates the benefits to each technique</li> <li>Uses correct scientific terminology</li> <li>Shows a logical sequence of thought</li> </ul>	5–6
<ul style="list-style-type: none"> <li>Gives example(s) and benefit(s) of invasive and/or non-invasive techniques</li> </ul>	3–4
<ul style="list-style-type: none"> <li>Gives examples or benefits</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

**Sample answer:**

Keyhole surgery and the insertion of a stent are examples of minimally invasive surgery. These types of surgery pose less risk to the patient because the use of anaesthetics is minimised or eliminated. Minimally invasive surgery also reduces the risk of infection and the recovery time compared to major surgery.

Ultrasound and MRI are examples of non-invasive medical techniques. Ultrasound is safer than other imaging techniques and so is suitable for obstetric use. MRI provides detailed structural or even functional information about tissues, including soft tissues, that cannot be obtained by using X-rays for example.

**Answers may include:**

Benefits in creating employment opportunities in medical technology fields, developments in new instruments and techniques.

**Question 28**

Criteria	Marks
• Presents TWO advantages and TWO examples	3
• Presents TWO advantages and ONE example OR • ONE advantage and TWO examples	2
• Presents either an advantage or an example	1

***Sample answer:***

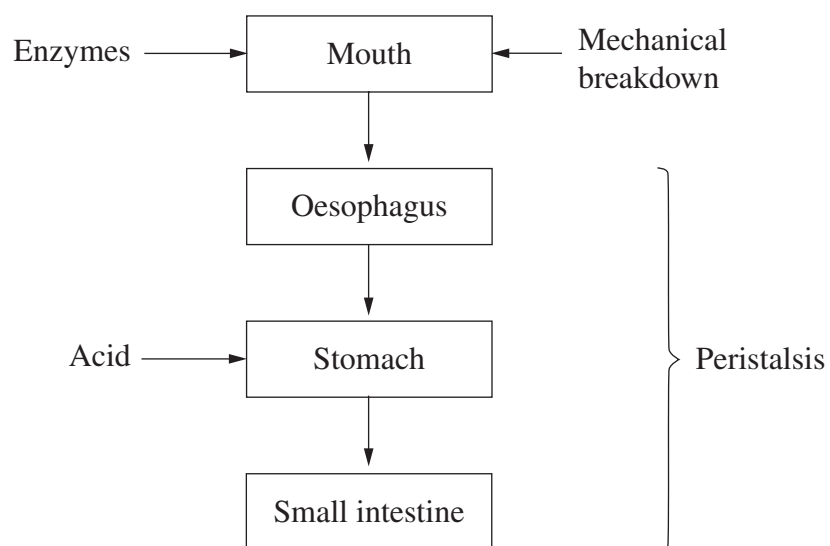
Advantages – If one or more of the systems fails, others can act as a backup. Secondly, if people do not have access to one of the methods, they may have access to another and so they still get the information.

Examples: people may have TV and radio turned off and receive an SMS message.



**Question 29 (a)**

Criteria	Marks
<ul style="list-style-type: none"> <li>All labels in a correct location</li> <li>Logical order of organs and correct location of processes and chemicals</li> <li>Flow chart format</li> </ul>	4
<ul style="list-style-type: none"> <li>Places organs in the correct sequence</li> <li>Most processes and chemicals correctly identified</li> <li>Flow chart format</li> </ul>	3
<ul style="list-style-type: none"> <li>Places organs in the correct sequence</li> <li>Any feature of a chart</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

**Sample answer:**

**Question 29 (b)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Relates the purpose of the enteric coating to its behaviour under different pH conditions</li> <li>Identifies the pH conditions in the stomach and the intestine either qualitatively or quantitatively</li> </ul>	3
<ul style="list-style-type: none"> <li>States that the coating does not break down in the stomach and that it breaks down in the intestine</li> </ul> OR <ul style="list-style-type: none"> <li>States that the coating breaks down in higher pH conditions but not in lower pH conditions</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

Enteric coatings are used to prevent some types of drugs from being active in the stomach. The enteric coating does not dissolve in strongly acidic solutions and the tablet therefore passes through the stomach without being broken down.

The coating dissolves in less acidic or in alkaline solutions, causing it to dissolve when the tablet reaches the small intestine, where the drug is released and absorbed.

**Question 30**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Demonstrates a thorough understanding of how a scientific understanding has helped to maintain life</li> <li>• Thoroughly describes how life support systems help to maintain life</li> <li>• Thoroughly describes how the release of medications helps to maintain life</li> <li>• Presents a logical and structured answer with extensive scientific terminology</li> </ul>	7–8
<ul style="list-style-type: none"> <li>• Demonstrates a sound understanding of how a scientific understanding has helped to maintain life</li> <li>• Describes how life support systems help to maintain life</li> <li>• Describes how the release of medications helps to maintain life</li> <li>• Some scientific terminology</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a basic understanding of how a scientific understanding has helped to maintain life</li> <li>• Outlines how life support system(s) help to maintain life</li> </ul> AND/OR <ul style="list-style-type: none"> <li>• Outlines how the release of medication(s) helps to maintain life</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Identifies a life support system and medication</li> </ul> OR <ul style="list-style-type: none"> <li>• Outlines a life support system or medication</li> </ul> OR <ul style="list-style-type: none"> <li>• Outlines an advance in scientific understanding that has helped maintain life</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

***Sample answer:***

Two examples of life support systems are artificial lungs and kidney dialysis machines.

We now understand about how the lungs function, that is, oxygen enters the blood and carbon dioxide leaves the blood through diffusion at the alveoli. An artificial lung is used to replace the function of a patient's lungs by redirecting the blood to a machine that allows these gases to be exchanged through a membrane by diffusion. This allows life to be maintained when normal lung function is not possible, for example during heart/lung surgery.

Similarly, we now understand about the kidney and how it removes urea, which is a toxic chemical. In kidney dialysis, the patient's blood is redirected to a dialysis machine where diffusion allows urea to be removed from the blood. This allows life to be maintained when normal kidney function is not possible, for example, kidney disease or trauma.

Two examples of medications are subdermal implants and enteric-coated tablets.

We now understand that some medications can be released under the skin through a slow rate of diffusion from a plastic implant. For example, a contraceptive implant can be inserted under the skin where it slowly releases the medication over an extended period of time. This has allowed us to maintain life by regulating hormonal cycles or preventing unwanted pregnancies, which could have serious health consequences for some patients.

Our understanding about the solubility of different chemicals and the pH in different areas of the digestive system has allowed us to develop enteric-coated tablets. We know that the stomach is acidic and the small intestine is alkaline, and thus different substances dissolve in these different pHs. This has allowed us to maintain life by preventing damage to the stomach and providing targeted medications that allow increased absorption in the area where the medication is required.

***Answers could include:***

Monitoring devices eg ECG

## Section II

### Question 31 (a) (i)

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies a natural polymer</li> </ul>	1

*Sample answer:*

Wool

### Question 31 (a) (ii)

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO benefits</li> </ul>	2
<ul style="list-style-type: none"> <li>Identifies ONE benefit</li> </ul>	1

*Sample answer:*

Lightweight

Shock absorbing

### Question 31 (a) (iii)

Criteria	Marks
<ul style="list-style-type: none"> <li>Gives an effect of heat on thermosetting polymers</li> <li>Gives an effect of heat on thermoplastic polymers</li> </ul>	2
<ul style="list-style-type: none"> <li>Gives an effect of heat on thermosetting polymers or thermoplastic polymers</li> </ul>	1

*Sample answer:*

Heat causes thermosetting polymers to char.

Heat causes thermoplastic polymers to soften.

**Question 31 (b)**

Criteria	Marks
• Identifies both benefits and problems	4
• Identifies both benefit(s) and problem(s)	3
• Identifies benefit(s) and / or problem(s)	2
• Identifies a benefit or a problem	1

***Sample answer:***

Benefits:

- It displays a large amount of information in one graph.
- It shows trends over time.
- It compares different categories.

Problems:

- Some polymers can be found in multiple categories, so it is difficult to determine how the number of new developments has changed over time for polymers.
- It is difficult to compare how the percentages have changed over the years when the columns do not line up.
- Could use a column graph so that the columns line up and give a clear visual representation of the data.
- Some of the bands of categories are so small that you cannot easily determine the percentage.

**Question 31 (c)**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Outlines a property of biodegradable plastics</li> <li>• States advantages and / or disadvantages of biodegradable plastics</li> <li>• Makes a judgement</li> </ul>	4
<ul style="list-style-type: none"> <li>• Outlines a property of biodegradable plastics</li> <li>• States some advantage(s) and / or disadvantage(s) of biodegradable plastics</li> <li>• Makes a judgement</li> </ul>	3
<ul style="list-style-type: none"> <li>• Supports a judgment with some evidence</li> </ul> OR <ul style="list-style-type: none"> <li>• Outlines properties or advantages of biodegradable plastics</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

***Sample answer:***

Biodegradable plastics break down in a relatively short period of time, while non-biodegradable plastics can last 1000s of years. The use of non-biodegradable plastics causes landfills to become overfull and plastic can remain in the ocean or waterways, accumulating and harming wildlife or disrupting water flows. Thus, biodegradable plastics are necessary to help reduce the accumulation of plastic waste.

**Question 31 (d)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO/THREE types of variables</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	4–5
<ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies THREE types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies ONE type of variable</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a type of variable</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Explains a problem with the experiment</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

- The independent variable was the temperature.
- The dependent variable was the length of the polymer fibre.
- Controlled variables included the 50 g mass that was used on each polymer fibre.
- The thickness of Polymer A and Polymer B were different to begin with, so it is not a fair test to compare the effect of temperature on the length of the polymer ie this variable was not controlled so it is not a valid experiment.



**Question 31 (e)**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Demonstrates an extensive knowledge of polymers</li> <li>• Identifies and describes the properties of TWO named natural and TWO named synthetic polymers</li> <li>• Links these properties to their use</li> <li>• Makes an assessment of the impact on society of each one</li> <li>• Communicates complex ideas and information using correct terminology</li> </ul>	7
<ul style="list-style-type: none"> <li>• Demonstrates thorough knowledge of polymers</li> <li>• Identifies and describes the properties of at least ONE natural and ONE synthetic polymer</li> <li>• Links these properties to their use</li> <li>• Attempts to assess the impact or value of each on society OR describes the impact on society in general of natural or synthetic polymers</li> <li>• Clearly communicates ideas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound knowledge of polymers</li> <li>• Identifies and describes TWO polymers</li> </ul> AND/OR <ul style="list-style-type: none"> <li>• Makes some link to their use</li> </ul> AND/OR Describes an impact on society of each OR outlines a general impact	3–4
<ul style="list-style-type: none"> <li>• Demonstrates a basic knowledge of polymers</li> <li>• Identifies and describes ONE or more polymers</li> </ul> OR <ul style="list-style-type: none"> <li>• Describes a use or impact of polymers</li> </ul> OR <ul style="list-style-type: none"> <li>• Some correct information about polymers</li> </ul>	1–2

***Answers could include:***

Natural polymers include wool, cotton, silk, hair/fur. They had a significant impact on society in the past, when synthetic polymers were not available. They allowed people to be warm, eg woollen or fur jackets, and thus live and work in countries all over the world. They also had an impact on fashion in society eg silk stockings, which were thinner than woollen stockings, and provided an economic advantage to the silk manufacturers. In addition, natural polymers are renewable and biodegradable. This benefits society by being more beneficial to the environment and providing an economic advantage to farmers.

Synthetic polymers include nylons, polyester, polyethylene, polystyrene. They have had a significant impact on society. They have replaced many of the natural polymers eg for clothing, kitchenware, packaging since they have a large range of properties and can be used for a large variety of purposes. Synthetic polymer manufacturing has provided millions of jobs for people and an economic advantage to the companies that produce polymers. The synthetic polymers can also be mixed in with natural polymers to provide even greater variety in applications eg mixed elastane and cotton clothing to give the good absorbency and breathability of cotton with the flexibility and durability of elastane.

**Question 32 (a) (i)**

Criteria	Marks
• Identifies a microbe that causes food spoilage	1

***Sample answer:***

Salmonella

**Question 32 (a) (ii)**

Criteria	Marks
• Outlines effects of temperature on microbial growth	2
• Outlines an effect of temperature on microbial growth	1

***Sample answer:***

Slightly higher temperatures increase the growth of the microbe but very high temperatures cause the microbes to die.

**Question 32 (a) (iii)**

Criteria	Marks
• Identifies treatments	2
• Identifies a treatment	1

***Sample answer:***

The stomach may be pumped to remove a toxic substance or electrolytes may be taken to replace lost water and salts.

**Question 32 (b)**

Criteria	Marks
• Identifies both benefits and problems	4
• Identifies both benefit(s) and problem(s)	3
• Identifies benefit(s) and/or problem(s)	2
• Identifies a benefit or a problem	1

***Answers could include:*****Benefits:**

- It displays a large amount of information in one graph.
- It shows trends over time.
- It compares different categories.

**Problems:**

- Some preservatives or additives can be found in multiple categories, so it is difficult to determine how the number of new processes has changed over time for preservatives or additives.
- It is difficult to compare how the percentages have changed over the years when the columns do not line up.
- Could use a column graph so that the columns line up and give a clear visual representation of the data.
- Some of the bands of categories are so small that you cannot easily determine the percentage.

**Question 32 (c)**

Criteria	Marks
<ul style="list-style-type: none"><li>• Provides detailed reasons for labelling</li><li>• Makes a judgement</li></ul>	4
<ul style="list-style-type: none"><li>• Provides some reasons for labelling</li><li>• Makes a judgement</li></ul>	3
<ul style="list-style-type: none"><li>• Supports a judgement with some evidence</li></ul> OR <ul style="list-style-type: none"><li>• Provides simple reasons for labelling</li></ul>	2
<ul style="list-style-type: none"><li>• Any relevant information</li></ul>	1

***Sample answer:***

Labelling food products is essential as the information is needed so that the consumer can make a decision about whether to buy the product or not. This could be for reasons such as if one has an allergic reaction with particular products. Another reason can be because additives and preservatives can interact with some people's medications. Also, some people have ethical or cultural reasons for not buying products with particular preservatives or additives in them, and therefore need these to be labelled on the product.

**Question 32 (d)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO/THREE types of variables</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	4-5
<ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies THREE types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies ONE type of variable</li> <li>Links the problem to the validity of the results</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a type of variable</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Explains a problem with the experiment</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

- The independent variable was the type of anti-caking agent.
- The dependent variable was the time taken for the containers to empty.
- Controlled variables included the amount of salt used each time (500 g).
- The width of the necks of the bottles were different, so it is not a fair test to compare the effect of anti-caking agent on the time taken for the contents to empty out ie this variable was not controlled so it is not a valid experiment.

**Question 32 (e)**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Demonstrates an extensive knowledge of physical and chemical methods</li> <li>• Identifies and describes the properties of TWO named physical and TWO named chemical methods of food preservation</li> <li>• Links these properties to their use</li> <li>• Makes an assessment of the impact on society of each one</li> <li>• Communicates complex ideas and information using correct terminology</li> </ul>	7
<ul style="list-style-type: none"> <li>• Demonstrates thorough knowledge of physical and chemical methods</li> <li>• Identifies and describes the properties of at least ONE physical and ONE chemical method of food preservation</li> <li>• Links these properties to their use</li> <li>• Attempts to assess the impact or value of each on society OR describes the impact on society in general of a physical or chemical method of food preservation</li> <li>• Clearly communicates ideas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound knowledge of physical and chemical methods</li> <li>• Identifies and describes TWO physical or TWO chemical OR ONE of each method of food preservation</li> </ul> AND/OR <ul style="list-style-type: none"> <li>• Makes some link to their use</li> </ul> AND/OR <ul style="list-style-type: none"> <li>• Describes an impact on society of each OR outlines a general impact</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Identifies and describes ONE physical or chemical method of food preservation</li> </ul> OR <ul style="list-style-type: none"> <li>• Describes a use or impact of a physical or chemical food preservation method</li> </ul> OR <ul style="list-style-type: none"> <li>• Some correct information about physical or chemical methods of food preservation</li> </ul>	1–2

***Answers could include:***

Physical methods include refrigeration and canning. Refrigeration involves decreasing the temperature of the food so that microbes grow more slowly. Canning involves sterilising the food with heat and then sealing the food inside the can, so that no microbes can get in. These physical methods have had a significant impact on society as they have allowed people to live all over the world, despite hot climates and to store foods for long periods of time. This allows people to eat whether the food is seasonal or not. Canning also provides employment for people working in manufacturing.

Chemical methods include using nitrates, nitrites and sulfites. These chemicals kill micro-organisms that cause the food to spoil. These chemicals have had a large impact on society as there is much less likelihood of food poisoning and therefore the impact on society includes decreased costs of hospitalisation and medications and even fewer deaths. Since the food can be preserved for longer, we have less food waste and this produces cost savings to the consumer.



**Question 33 (a) (i)**

Criteria	Marks
• Identifies a sense organ	1

***Sample answer***

Eye

**Question 33 (a) (ii)**

Criteria	Marks
• Identifies difference	2
• Identifies a response of muscles or glands	1

***Sample answer:***

Muscles usually produce a response almost immediately while glands usually produce a response over a longer period of time.

**Question 33 (a) (iii)**

Criteria	Marks
• Correct sequence of events	2
• Part of the sequence is correct	1

***Sample answer:***

Stimulus → Receptor on sensory neuron → Spinal cord with interneurons → Motor neuron  
→ Effector eg muscle → Response

**Question 33 (b)**

Criteria	Marks
• Identifies both benefits and problems	4
• Identifies both benefit(s) and problem(s)	3
• Identifies benefit(s) and / or problem(s)	2
• Identifies a benefit or a problem	1

***Answers could include:*****Benefits:**

- It displays a large amount of information in one graph
- It shows trends over time
- It compares different categories

**Problems:**

- Some pharmaceuticals can be found in multiple categories, so it is difficult to determine how the number of new pharmaceuticals has changed over time.
- It is difficult to compare how the percentages have changed over the years when the columns do not line up
- Could use a column graph so that the columns line up and give a clear visual representation of the data
- Some of the bands of categories are so small that you cannot easily determine the percentage

**Question 33 (c)**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Makes a judgement</li> <li>• Describes experiments or contributions of one of the scientists</li> <li>• Links how this has affected our understanding of bacteria</li> </ul>	4
<ul style="list-style-type: none"> <li>• Makes a judgement</li> <li>• Describes experiments or contributions of one of the scientists OR identifies advances in our understanding of bacteria</li> </ul>	3
<ul style="list-style-type: none"> <li>• Supports a judgement with some evidence</li> </ul> OR <ul style="list-style-type: none"> <li>• Provides simple reasons for the importance of the scientist</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

***Answers could include:******Pasteur***

Pasteur was extremely important to our understanding of bacteria. He used swan-necked flasks to prove that microbes such as bacteria were present in the air, which disproved spontaneous generation and thus provided an important development in our knowledge of bacteria. He also improved our knowledge about how to kill bacteria by using the process of heating the food to a temperature that kills the microbes (later called pasteurisation).

***Koch***

Koch was extremely important to our understanding of bacteria. He used sheep inoculations to prove that a particular bacterium could cause the disease anthrax. He did this using a set of postulates that he created. This used a logical strategy to establish the cause and effect of a particular bacterium and its disease. This contributed to our understanding of bacteria since we could now identify the causes of specific bacterial diseases.

**Question 33 (d)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO/THREE types of variables</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	4–5
<ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies THREE types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies ONE type of variable</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a type of variable</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Explains a problem with the experiment</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

- The independent variable was the temperature.
- The dependent variable was the size of the bacterial colonies.
- Controlled variables included the amount of time that the bacteria were left to grow
- The two agar plates were exposed to air, allowing different types of bacteria to begin growing on the agar, so it is not a fair test to compare the effect of temperature on the time taken for a specific bacteria to grow ie this variable was not controlled so it is not a valid experiment.

***Answers could include:***

Lack of a control.

**Question 33 (e)**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Demonstrates an extensive knowledge of analgesics and antibiotics</li> <li>• Discusses the use of analgesics and antibiotics with examples</li> <li>• Links their use to treating disease</li> <li>• Makes an assessment on the impact on society of each one</li> <li>• Communicates complex ideas and information using correct terminology</li> </ul>	7
<ul style="list-style-type: none"> <li>• Demonstrates thorough knowledge of analgesics and antibiotics</li> <li>• Describes the use of analgesics and antibiotics with examples</li> <li>• Links their use to treating disease</li> <li>• Attempts to assess the impact or value of each on society OR describes the impact on society in general of analgesics or antibiotics</li> <li>• Clearly communicates ideas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound knowledge of analgesics and/or antibiotics</li> <li>• Identifies and describes the uses of analgesics or antibiotics</li> </ul> AND/OR <ul style="list-style-type: none"> <li>• Makes some link to their use</li> </ul> AND/OR Describes an impact on society of each OR outlines a general impact	3–4
<ul style="list-style-type: none"> <li>• Displays a basic knowledge of analgesics and/or antibiotics</li> <li>• Describes a use or impact of analgesics and/or antibiotics</li> </ul> OR <ul style="list-style-type: none"> <li>• Some correct information about analgesics and/or antibiotics</li> </ul>	1–2

***Answers could include:***

Analgesics such as aspirin have had a significant impact on society. Due to improved pain relief, people are able to work effectively even when in pain, and thus provide contributions to society and improve the economy. It also helps reduce costs for the hospital system.

Antibiotics such as penicillin have also had a huge impact on society. They function to selectively kill bacteria. Different antibiotics kill different types of bacteria. This is a benefit to society since a range of different diseases can be controlled. Another advantage to society has been the great effectiveness of antibiotics, to the point where the disease may be eliminated from the person and the spread of the disease largely reduced. There is also less care and fewer medical costs due to quicker recovery of the patient.

However, antibiotics are also selective agents that have caused the development of multi-drug resistant bacteria. This is a problem as it means that over time we may no longer be able to use antibiotics effectively and may have uncontrollable bacterial epidemics. This is detrimental to society as it may cause many deaths and decreased labour in society.

A large component of the pharmaceutical industry is involved in research and manufacturing analgesics and antibiotics, and thus provides a large number of jobs and economic benefit to society as a whole.

These facts demonstrate that both analgesics and antibiotics have had a great impact on society.

**Question 34 (a) (i)**

Criteria	Marks
• Identifies a specific natural disaster	1

***Sample answer***

Cyclone Tracy

**Question 34 (a) (ii)**

Criteria	Marks
• Provides reasons	2
• Provides a reason	1

***Sample answer:***

So that the company's liabilities are unambiguous and so that the insured knows exactly what they are covered for.

**Question 34 (a) (iii)**

Criteria	Marks
• States effects related to the slope	2
• States an effect	1

***Sample answer:***

The fire spreads faster up a slope and spreads more slowly down a slope.

**Question 34 (b)**

Criteria	Marks
• Identifies both benefits and problems	4
• Identifies both benefit(s) and problem(s)	3
• Identifies benefit(s) and / or problem(s)	2
• Identifies a benefit or a problem	1

***Answers could include:*****Benefits:**

- It displays a large amount of information in one graph.
- It shows trends over time.
- It compares different categories.

**Problems:**

- Some technologies used to help predict disasters can be found in multiple categories, so it is difficult to determine how the number of new technologies has changed over time.
- It is difficult to compare how the percentages have changed over the years when the columns do not line up.
- Could use a column graph so that the columns line up and give a clear visual representation of the data.
- Some of the bands of categories are so small that you cannot easily determine the percentage.



**Question 34 (c)**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Makes a judgement</li> <li>• Outlines how satellite photographs are used to interpret weather patterns</li> <li>• Provides reasons for their use</li> </ul>	4
<ul style="list-style-type: none"> <li>• Makes a judgement</li> <li>• Outlines how satellite photographs are used to interpret weather patterns</li> <li>OR Provides reasons for their use</li> </ul>	3
<ul style="list-style-type: none"> <li>• Supports a judgement with some evidence</li> </ul> OR <ul style="list-style-type: none"> <li>• Provides simple reasons for satellite photographs</li> </ul> OR <ul style="list-style-type: none"> <li>• Provides a use and a reason for satellite photographs</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

***Sample answer:***

Satellite photographs provide a global view of cloud patterns, allowing weather to be more reliably forecast over a larger area. Also, because the satellites pass overhead on a regular basis, they provide us with long-term patterns that can be used to predict events. They can also relate cloud photographs to other data that is collected on the ground and hence deduce relationships between the movement of cloud systems and other factors that affect the weather. Satellite photographs can be taken with infrared and visible wavelengths, which helps provide further data. Without satellite photographs, weather forecasting requires many stations on land and is less able to provide reliable predictions or warnings. This means there may be no warning for cyclones or other dangerous weather patterns and may lead to loss of life or property. Thus, satellite photographs are essential to the interpretation of weather patterns since forecasting is now quicker, more reliable and provides earlier warnings.

**Question 34 (d)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO/THREE types of variables</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	4–5
<ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies THREE types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies ONE type of variable</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a type of variable</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Explains a problem with the experiment</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

- The independent variable was the pressure applied by the mass on the syringe.
- The dependent variable was the volume of gas.
- Controlled variables included the same type of gas in each syringe.
- The two syringes are different diameters with different volumes of gas to start with, so it is not a fair test to compare the effect of pressure on the volume of the gas ie this variable was not controlled so it is not a valid experiment.

**Question 34 (e)**

<b>Criteria</b>	<b>Marks</b>
<ul style="list-style-type: none"> <li>• Demonstrates an extensive knowledge of warning devices and emergency services</li> <li>• Discusses the use of warning devices and emergency services</li> <li>• Links their use to reducing the effects of fire</li> <li>• Makes an assessment of the impact on society of each one</li> <li>• Communicates complex ideas and information using correct terminology</li> </ul>	7
<ul style="list-style-type: none"> <li>• Demonstrates a thorough knowledge of warning devices and emergency services</li> <li>• Describes the use of warning devices and emergency services</li> <li>• Links their use to reducing the effects of fire</li> <li>• Attempts to assess the impact or value of each on society OR describes the impact on society in general of warning devices and emergency services</li> <li>• Clearly communicates complex ideas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound knowledge of warning devices and/or emergency services</li> <li>• Identifies and describes TWO warning devices or emergency services or one of each</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>• Makes some link to their use</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>• Describes an impact on society of each OR outlines a general impact</li> </ul>	3–4
<ul style="list-style-type: none"> <li>• Demonstrates a basic knowledge of warning devices or emergency services</li> <li>• Identifies and describes ONE warning device or emergency service</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Describes a use or impact of a warning device and emergency service</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Some correct information about warning devices and emergency services</li> </ul>	1–2

***Sample answer:***

Warning devices and emergency services have had a significant impact on our ability to minimise the effects of fires. For example, we use smoke detectors and fire alarms to warn of fires and rely on the fire brigade and the Rural Fire Service to assist when a fire occurs.

Warning devices such as smoke detectors make a loud noise that can wake occupants in a house so that they can escape a fire. Fire alarms are used in large buildings so that when a fire is detected on one level of the building, all other levels are alerted and occupants are made aware of when to evacuate in an orderly fashion. The fire brigade is also alerted and can arrive quickly.

These detectors and alarms have an impact on society because they can save lives and buildings. As a result, they have now been included as part of the building codes. There are economic effects of this, as the manufacturers who produce the smoke alarms and fire detectors are profiting from this, as well as the producers of batteries. In addition, there are environmental effects from replacing batteries regularly, since the used batteries are thrown out and can leak into the soil in landfills. However, sometimes people do not keep their smoke detectors in working order eg replacing batteries, which can then have further impacts as one burning building can lead to others being affected and causing a larger fire which then requires emergency services and has impacts on society.

The fire brigade and Rural Fire Service arrive at fires and work to minimise the effect of the fire. The fire brigade works to put out the fire quickly, as well as providing assessments of buildings and evacuation plans to ensure that people's environment is as safe as possible. The Rural Fire Service can help to minimise bushfires by backburning and removing flammable material and shrubs to create firebreaks. They will also attempt to put out bushfires and save buildings and houses from burning.

The impacts on society of these services include saving lives and buildings as well as providing jobs. However, maintaining these services requires money to keep the services on standby all the time. The people also require extensive training and their equipment needs to be maintained and updated regularly, which is expensive and therefore affects the economy.

**Question 35 (a) (i)**

Criteria	Marks
• Identifies a circadian rhythm	1

***Sample answer***

Body temperature

**Question 35 (a) (ii)**

Criteria	Marks
• States effects	2
• States an effect	1

***Sample answer:***

Difficulty sleeping; waking or feeling hungry at inappropriate times.

**Question 35 (a) (iii)**

Criteria	Marks
• Provides methods to maintain a normal circadian rhythm	2
• Provides a method to maintain a normal circadian rhythm	1

***Sample answer:***

Turn lights on and off on a regular 24 hour schedule.

Eat on a regular basis similar to an Earth timetable.

**Question 35 (b)**

Criteria	Marks
• Identifies both benefits and problems	4
• Identifies both benefit(s) and problem(s)	3
• Identifies benefit(s) and / or problem(s)	2
• Identifies a benefit or a problem	1

***Answers could include:*****Benefits:**

- It displays a large amount of information in one graph.
- It shows trends over time.
- It compares different categories.

**Problems:**

- Some technologies used in space exploration can be found in multiple categories, so it is difficult to determine how the number of new technologies has changed over time.
- It is difficult to compare how the percentages have changed over the years when the columns do not line up.
- Could use a column graph so that the columns line up and give a clear visual representation of the data.
- Some of the bands of categories are so small that you cannot easily determine the percentage.

**Question 35 (c)**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Makes a judgement</li> <li>• Outlines the effects of microgravity on muscles</li> <li>• Outlines the effects of exercise on the major muscle groups</li> </ul>	4
<ul style="list-style-type: none"> <li>• Makes a judgement</li> </ul> Outlines the effects of microgravity on muscles OR outlines the effects of exercise on the major muscle groups	3
<ul style="list-style-type: none"> <li>• Supports a judgement with some evidence</li> </ul> OR <ul style="list-style-type: none"> <li>• Provides simple reasons for exercise</li> </ul>	2
<ul style="list-style-type: none"> <li>• Any relevant information</li> </ul>	1

***Sample answer:***

It is essential to exercise all major muscle groups otherwise the muscles start to weaken, since in the absence of gravity they are not working as hard to make the body move. Without the effects of gravity, the body does not need to use muscles for support. If left without exercise, when the astronaut returns to Earth they will not be able to walk or carry heavy objects. In addition, without weight-bearing exercise, the bones also begin to weaken. Muscles work together in the body, so both of the complementary muscle groups must be exercised to ensure muscle tone remains.

**Question 35 (d)**

Criteria	Marks
<ul style="list-style-type: none"> <li>Identifies TWO/THREE types of variables</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	4–5
<ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies THREE types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies ONE type of variable</li> <li>Explains a problem with the experiment</li> <li>Links the problem to the validity of the results</li> </ul>	3
<ul style="list-style-type: none"> <li>Identifies a type of variable</li> <li>Outlines a problem with the experiment</li> </ul> OR <ul style="list-style-type: none"> <li>Identifies TWO types of variables</li> </ul> OR <ul style="list-style-type: none"> <li>Explains a problem with the experiment</li> </ul>	2
<ul style="list-style-type: none"> <li>Any relevant information</li> </ul>	1

***Sample answer:***

- The independent variable was the type of camera.
- The dependent variable was the number of stars visible in the photograph.
- Controlled variables included the same part of the sky each time.
- Camera A and Camera B used different exposure times, so it is not a fair test to compare the performance of each camera ie this variable was not controlled so it is not a valid experiment.



**Question 35 (e)**

Criteria	Marks
<ul style="list-style-type: none"> <li>• Demonstrates an extensive knowledge of technologies developed for space exploration</li> <li>• Identifies and describes the features of TWO named technologies developed for space exploration</li> <li>• Links these properties to their use</li> <li>• Makes an assessment of the impact on society of each one</li> <li>• Communicates complex ideas and information using correct terminology</li> </ul>	7
<ul style="list-style-type: none"> <li>• Demonstrates thorough knowledge of technologies developed for space exploration</li> <li>• Identifies and describes the features of at least ONE technology developed for space exploration</li> <li>• Links these properties to their use</li> <li>• Attempts to assess the impact or value of each on society OR describes the impact on society in general of technology developed for space exploration</li> <li>• Clearly communicates ideas</li> </ul>	5–6
<ul style="list-style-type: none"> <li>• Demonstrates a sound knowledge of technologies developed for space exploration</li> <li>• Identifies and describes TWO technologies developed for space exploration</li> </ul> <p>AND/OR</p> <ul style="list-style-type: none"> <li>• Makes some link to their use</li> </ul> <p>AND/OR</p> <p>Describes an impact on society of each OR outlines a general impact</p>	3–4
<ul style="list-style-type: none"> <li>• Demonstrates a basic knowledge of technologies developed for space exploration</li> <li>• Identifies and describes ONE or more technology developed for space exploration</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Describes a use or impact of technology developed for space exploration</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>• Some correct information about technology developed for space exploration</li> </ul>	1–2

***Sample answer:***

Space exploration has had a significant impact on society. It has resulted in many spin-offs such as the development of satellites that are now used for GPS and satellite phones and also the miniaturisation of computer systems.

The development of satellites has changed society dramatically. GPS has allowed people to navigate and find locations easily and thus has become part of most smartphones and is part of car navigation systems. These are used widely. Satellite phones have allowed people in remote areas to maintain contact with others and if there is a problem, can be used in conjunction with GPS to allow the user to contact emergency services and help them to find the person. Satellite technology has allowed weather predictions to be made and has improved our warning systems for cyclones and helped with predictions for crop yields.

The miniaturisation of computer systems has had an even bigger impact on society. It has allowed computers to become part of most households and has enabled them to be incorporated into consumer devices such as fridges, washing machines, motor vehicles, phones. This has impacted society as it has provided jobs for people involved in the production of these devices as well as providing profits for the companies that manufacture the devices. It has allowed computer modelling of many systems which have helped to design eg roads and infrastructure. It has also allowed many medical technologies to be produced, which has saved lives.

However, since so many of our technologies involve miniaturised computer systems, if there are problems with the technology it can disrupt society in many ways. For example, train services may be severely disrupted, ATMs can stop functioning and traffic lights can fail, causing chaos. Also, since banking and other important functions now occur on networks, hackers can break into these and disrupt their functioning.

# Senior Science

## 2014 HSC Examination Mapping Grid

### Section I Part A

Question	Marks	Content	Syllabus outcomes
1	1	9.2.2.2.2	H8
2	1	9.2.3.2.1	H9
3	1	9.4.2.2.1, 9.4.3.2.1	H10, H14
4	1	9.3.5.2.1, 9.3.5.2.2	H7
5	1	9.3.2.2.1	H9
6	1	9.3.2.2.1	H9
7	1	9.2.1.2.4, 9.2.1.3.4	H8
8	1	9.3.4.2.1	H9
9	1	9.2.2.2.1	H8
10	1	9.4.5.2.3, 9.4.1.2.1	H10
11	1	9.3.3.2.2	H9, H14
12	1	9.4.2.3.1	H10, H14
13	1	9.3.5.2.2	H10
14	1	9.2.1.2.4, 9.2.1.2.5	H8
15	1	9.2.5.2.3	H9, H14
16	1	9.3.2.2.9, 9.3.2.3.6	H7, H9
17	1	9.4.3.2.1	H10
18	1	9.4.5.2.3	H10
19	1	9.1	H11, H13
20	1	9.4.2.2.1, 9.4.3, 9.1	H14

### Section I Part B

Question	Marks	Content	Syllabus outcomes
21	2	9.4.5.2.1	H10
22 (a)	2	9.3.3.2.10	H3, H8, H9
22 (b)	2	9.3.3.2.10	H9
22 (c)	2	9.3.3.2.3	H9
23 (a)	2	9.4.6.2.1/2	H3, H10
23 (b)	2	9.4.6.2.2	H13
24 (a)	2	9.1	H12.2, H13
24 (b)	2	9.2.1.1/2/3	H8
24 (c)	3	9.2.2.2.5, 9.2.2.2.6	H4, H8
25	6	9.4	H3, H4, H10

Question	Marks	Content	Syllabus outcomes
26 (a)	3	9.1	H13.1(f)
26 (b)	3	9.3.2.3.1	H7, H9
27	6	9.3.5	H3, H4, H7, H9
28	3	9.4.1.2.6	H3, H4, H10
29 (a)	4	9.2.5.2.1, 9.1	H9, H13.1
29 (b)	3	9.2.4.3.1, 9.2.5.2.4	H3, H4, H8, H9
30	8	9.2.4, 9.2.5, 9.3.4	H1, H3, H4, H7, H8, H9

**Section II**

Question	Marks	Content	Syllabus outcomes
<b>Question 31</b>		<b>Polymers</b>	
31 (a) (i)	1	9.5.1.2.3	H8
31 (a) (ii)	2	9.5.2.2.1	H8
31 (a) (iii)	2	9.5.3.2.2	H8
31 (b)	4	9.1	H13, H14
31 (c)	4	9.5.4.2.3	H8
31 (d)	5	H11.2 (a–c)	H11
31 (e)	7	9.5.1, 9.5.2, 9.5.3, 9.5.4	H4
<b>Question 32</b>		<b>Preservatives and Additives</b>	
32 (a) (i)	1	9.6.3.2.1	H7
32 (a) (ii)	2	9.6.3.2.2	H7
32 (a) (iii)	2	9.6.3.3.1	H3, H7, H8
32 (b)	4	9.1	H14
32 (c)	4	9.6.5.2.4	H1
32 (d)	5	H11.2 (a–c)	H11
32 (e)	7	9.6.1, 9.6.2, 9.6.3, 9.6.4	H4
<b>Question 33</b>		<b>Pharmaceuticals</b>	
33 (a) (i)	1	9.7.1.2.3	H9
33 (a) (ii)	2	9.7.1.2.5	H9
33 (a) (iii)	2	9.7.1.2.6	H9
33 (b)	4	9.1	H14
33 (c)	4	9.7.4.3.1	H1
33 (d)	5	9.7.4.3.2 (H11.2)	H11
33 (e)	7	9.7.3, 9.7.4	H4

Question	Marks	Content	Syllabus outcomes
<b>Question 34</b>		<b>Disasters</b>	
34 (a) (i)	1	9.8.1.3.2	H10
34 (a) (ii)	2	9.8.1.3.1	H4
34 (a) (iii)	2	9.8.3.2.6	H7
34 (b)	4	9.1	H14
34 (c)	4	9.8.2	H2
34 (d)	5	9.8.2.3.1	H11
34 (e)	7	9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5	H4
<b>Question 35</b>		<b>Space Science</b>	
35 (a) (i)	1	9.9.3.2.7	H9
35 (a) (ii)	2	9.9.3.2.7	H7
35 (a) (iii)	2	9.9.3.2.8	H1, H2
35 (b)	4	9.1	H14
35 (c)	4	9.9.3.3.1	H2
35 (d)	5	9.1	H11.2 (a–e)
35 (e)	7	9.9.6, 9.9.4, 9.9.5	H4