



Pymble Ladies' College

TRIAL HSC EXAMINATION 2014

SENIOR SCIENCE

Total marks – 100

General Instructions

- Reading time - 5 minutes
- Working time - 3 hours
- Write using blue or black pen.
- Draw diagrams using pencil.
- Board-approved calculators may be used.
- Write your student number on EVERY page and on your writing booklet.
- The multiple choice answer sheet may be removed from the back of this paper.

Section I

75 marks

This section has two parts, Part A and Part B.

Part A – 20 marks

- Attempt questions 1 - 20
- Allow about 35 minutes for this part

Part B - 55 marks

- Attempt questions 21 - 32
- Allow about 1 hour and 40 minutes for this part

Section II

25 marks

- Question 32 is compulsory
- Allow about 45 minutes for this section

Section I**PART A****Total marks (20)****Allow about 35 minutes for this part****Use the multiple choice Answer Sheet for *ALL* multiple choice answers.**

Select the alternative A, B, C or D that best answers the question. Fill in the response circle completely.

Sample $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9A B C D

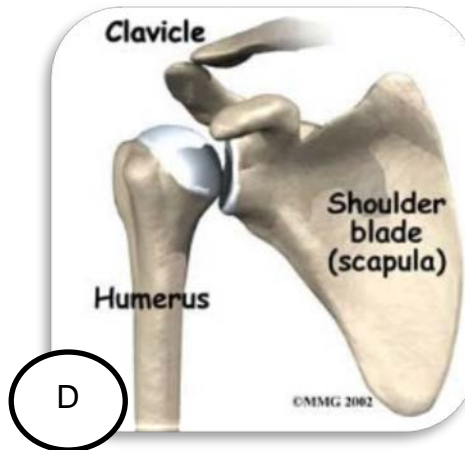
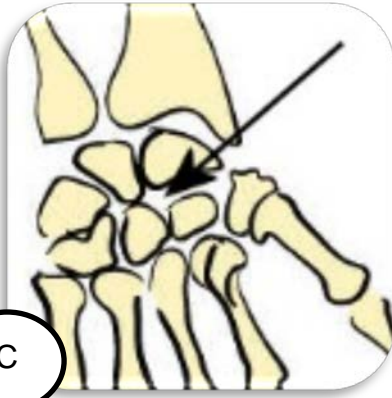
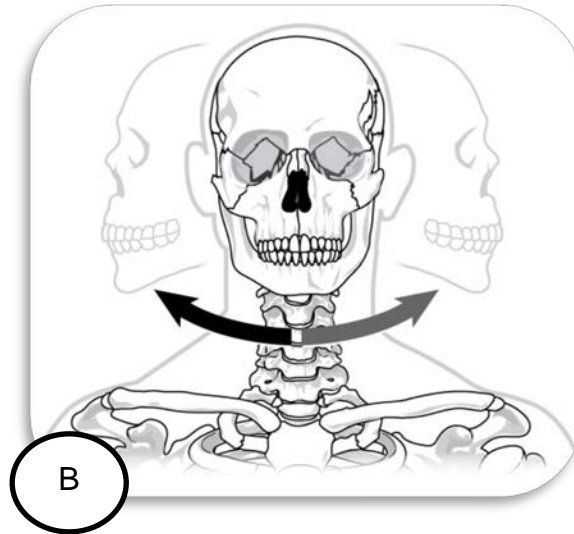
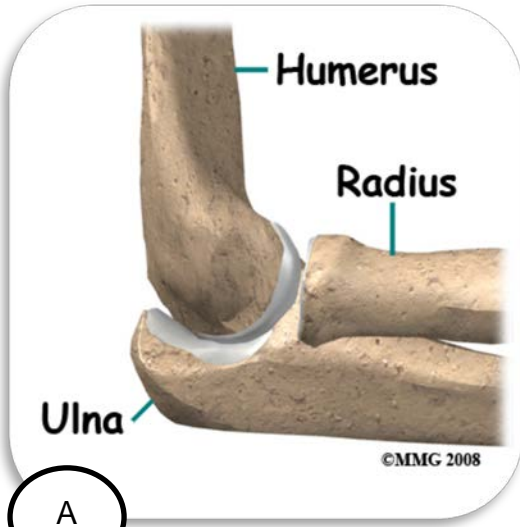
If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A B C D If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word **correct** and drawing an arrow as follows:

correct
↙
 A B C D

Questions 1-20 are multiple choice questions.

Use the following diagrams to answer Questions 1-4



1. Joint A is a:
 - A. Sliding joint
 - B. Pivot joint
 - C. Hinge joint
 - D. Ball and Socket joint

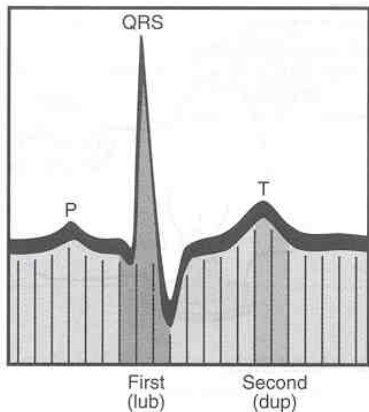
2. Joint B is a:
 - A. Sliding joint
 - B. Pivot joint
 - C. Hinge joint
 - D. Ball and Socket joint

3. Joint C is a:
 - A. Sliding joint
 - B. Pivot joint
 - C. Hinge joint
 - D. Ball and Socket joint

4. Joint D is a:
 - A. Sliding joint
 - B. Pivot joint
 - C. Hinge joint
 - D. Ball and Socket joint

5. Which statement describes the function of the diaphragm when a person breathes in?
 - A. The diaphragm relaxes and moves downwards, increasing the air pressure in your lungs causing air to flow in.
 - B. The diaphragm contracts and moves upwards, decreasing air pressure in your lungs causing air to flow in.
 - C. The diaphragm contracts and moves downwards, expanding your lungs causing air to flow in.
 - D. The diaphragm relaxes and moves upwards, expanding your lungs causing air to flow in.

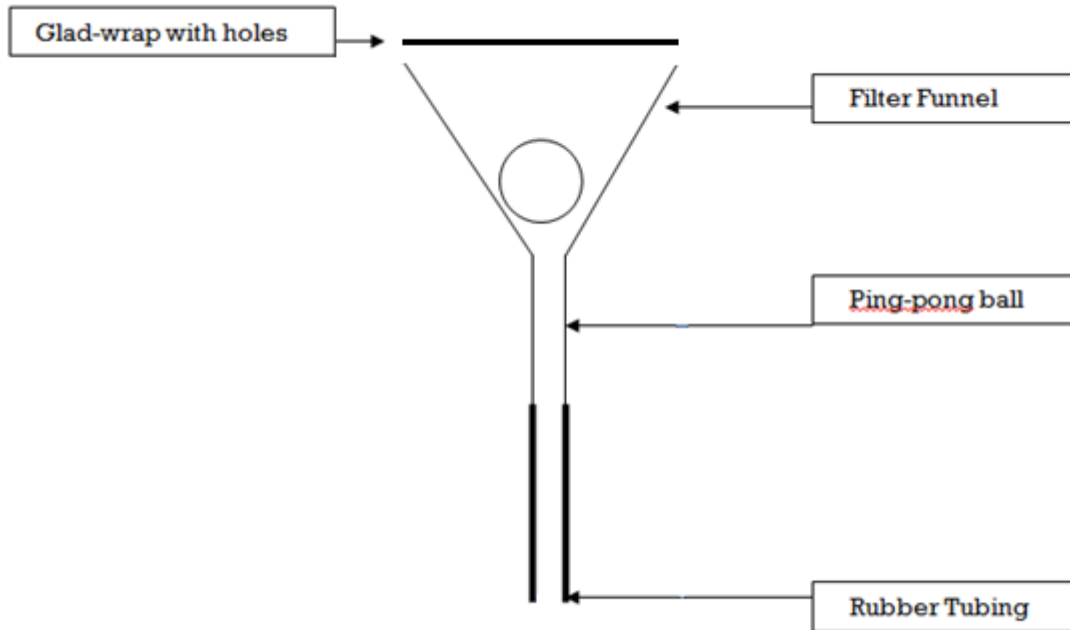
6. The diagram shows an electrocardiogram (ECG) for a single pulse of the heart.



What is the sequence of actions that occur in the heart to match the PQRST signal?

	Signal Beginning	P	QRS	T
A	Begins in the left atrium	Ventricles contract	Atria contract	Atria relax
B	Begins in the left atrium	Atria relax	Left ventricle contracts	Right ventricle contracts
C	Begins in the right atrium	Atria contract	Right ventricle contracts	Left ventricle contracts
D	Begins in the right atrium	Atria contract	Ventricles contract	Ventricles relax

7. In class you modelled a body part using the equipment below:



What does this equipment model?

- A. Knee joint
 - B. Sino-atrial node
 - C. Lungs
 - D. Heart valve
8. Which form of radiation from the electromagnetic spectrum do optical fibres transmit?
- A. Radio waves
 - B. Infra red
 - C. Microwaves
 - D. Visible light
9. Why do geostationary satellites appear nearly stationary in the sky as seen by a ground-based observer?
- A. They are located at such a great distance from Earth that they appear to be stationary
 - B. Geostationary satellites do not move at all and are held in a fixed position by small rockets whilst the Earth rotates on its axis
 - C. The satellite is directly over the equator orbiting once every 24 hours in the same direction as the Earth's rotation
 - D. This is an optical illusion caused by the refraction of light from the Earth's atmosphere

10. Which device converts *sound energy* into *electrical energy*?

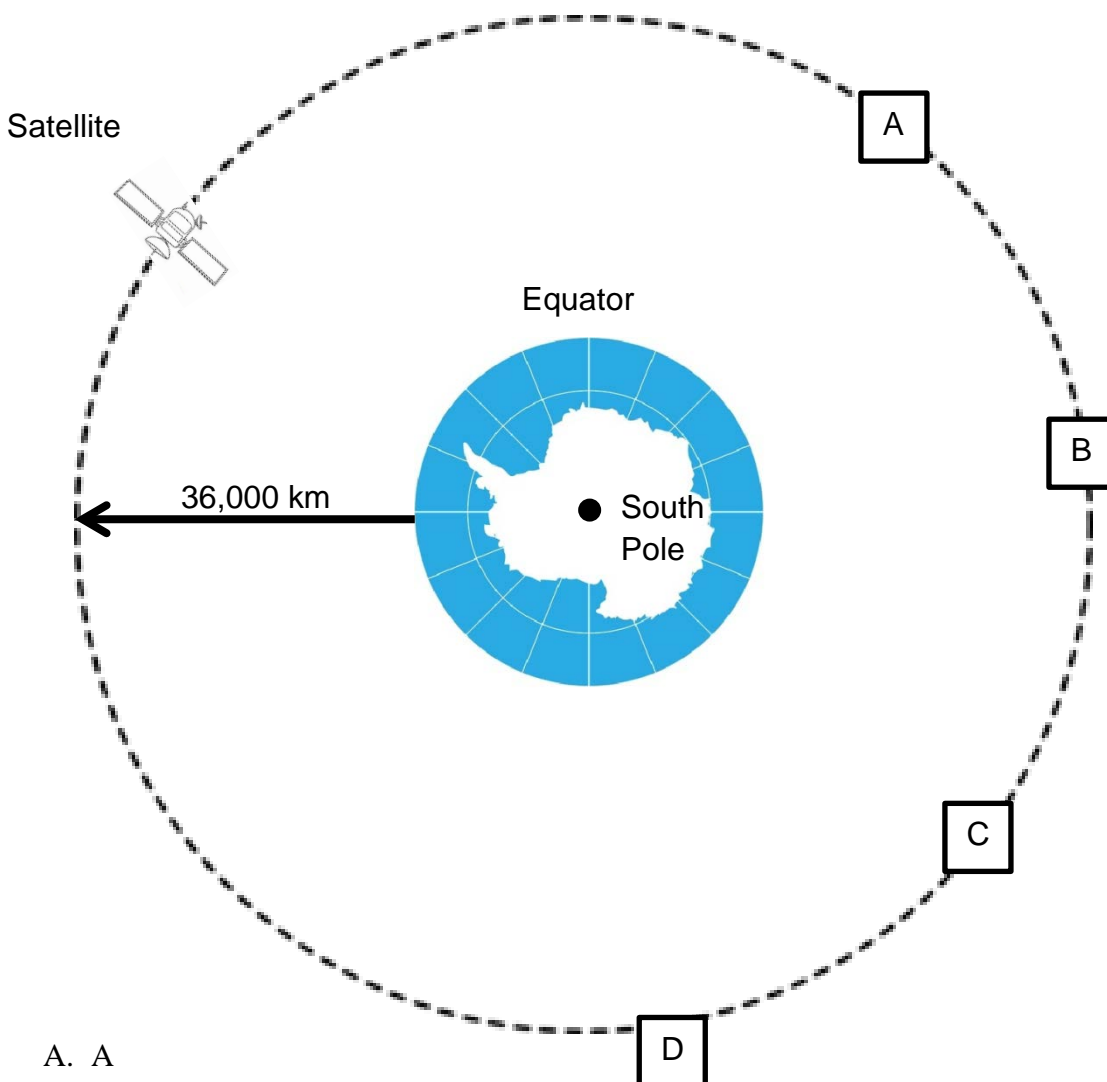
- A. A fax machine
- B. An electric fan
- C. An optical fibre
- D. A microphone

11. In many communication systems, the sender and receiver are not physically linked.

In these systems, how is the signal transmitted between sender and receiver?

- A. Binary numbers
- B. Digital signals
- C. Electromagnetic waves
- D. Communication satellites

12. Where will the satellite be in nine (9) hours?



- A. A
- B. B
- C. C
- D. D

13. Why are microwaves used in mobile phone systems rather than radio waves?
- A. Microwaves are faster
 - B. Microwaves can be reflected
 - C. Microwaves travel in straight lines
 - D. Microwaves only need very small antennas

Answer questions 14 and 15 using the picture of the SMS conversation below.



14. Identify where the information transfer process has failed.
- A. The message was never successfully sent
 - B. The code is not common to both parties
 - C. The decoder failed to reconstruct the message as it was initially sent
 - D. The digital coding of the message was done in analog form instead of digital
15. Which option best classifies SMS as an information system?
- A. verbal, short distance
 - B. verbal, long distance
 - C. non-verbal, short distance
 - D. non-verbal, long distance

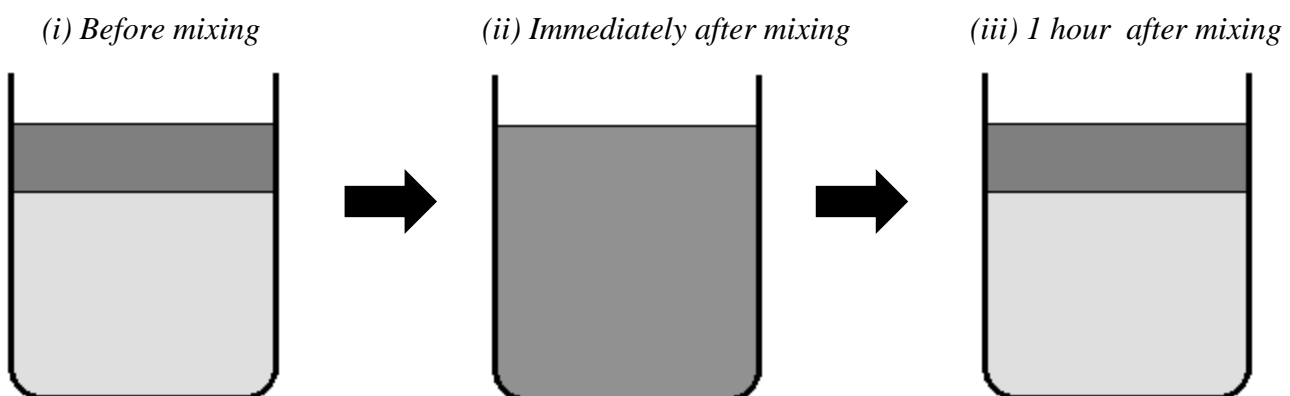
16. Which alternative best identifies the correct pH of human skin, the stomach and shower gel?

	<i>Skin</i>	<i>Stomach</i>	<i>Shower gel</i>
A.	7	2	10
B.	8	5	7
C.	5	2	5
D.	5	9	5

17. Skin microflora are microorganisms that live on the skin. Why are they considered helpful rather than harmful?

- A. They actively seek out and destroy pathogens
- B. They help to maintain the pH of skin at 7 which discourages colonisation by microbes and competition for resources
- C. They produce essential vitamins that we cannot obtain from our diet
- D. They prevent pathogens from colonising the skin by lowering the pH and competing for resources

18. The following images are of the same beaker, and the same mixture, at three different stages of an experiment.



What is the name of this type of substance?

- A. Solution
- B. Suspension
- C. Colloid
- D. Surfactant

19. You apply a cosmetic product to your skin and it feels cold to the touch. What form of colloid is it?
- A. Water-in-water
 - B. Water-in-oil
 - C. Oil-in-water
 - D. Oil-in-oil
20. Some mixtures require shaking before use. Examples include salad dressing and some medications. Why do they need to be shaken before use?
- A. To separate the mixture into layers
 - B. To heat up the particles within the container
 - C. To ensure a homogenous mix of the particles
 - D. They don't need to be shaken

Section I (continued)

PART B

Total marks (55)

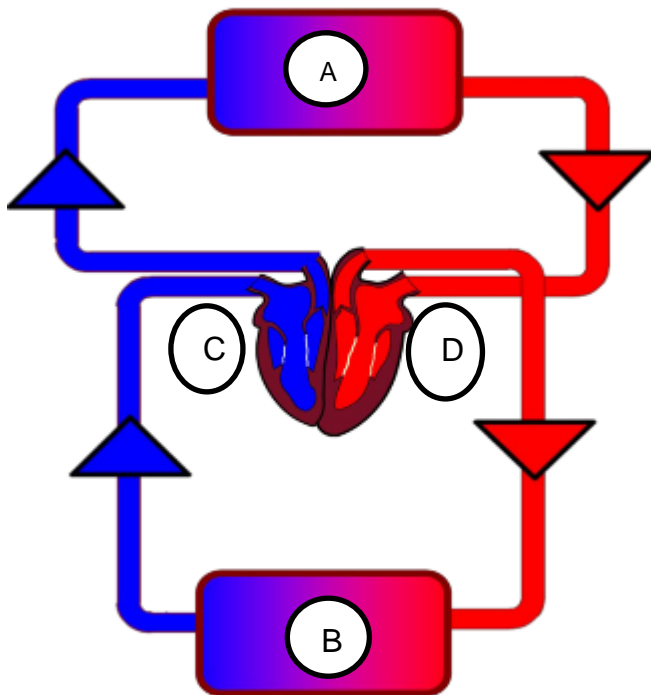
Attempt Questions

Allow about 1 hour and 40 minutes for this part.

Answer the questions in the spaces provided.

Question 21 (4 marks)

The diagram shows the flow of blood into and out of the heart.



Explain the change in carbon dioxide levels in the different parts (A, B, C and D) of the diagram. 4

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Question 22 (5 marks)

a) Identify **ONE** biomaterial or biomedical device that can be used to replace/repair a damaged bone. 1

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b) Describe **TWO** properties of superalloys that make them suitable for hip replacements. 2

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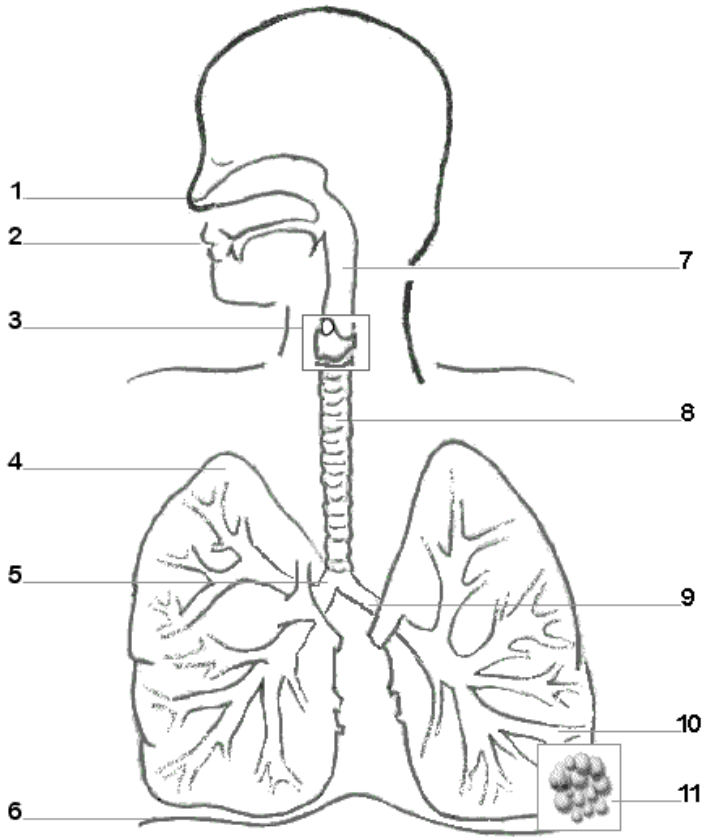
c) Describe the differences between cemented and uncemented artificial implants. 2

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Question 23 (8 marks)

a) Label the structures numbered **4, 6 and 9** on the diagram below:

3



b) Identify the function of an artificial lung.

1

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c) Discuss the type of operation that would require the use of an artificial lung.

2

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Question 23 is continued over page.

d) Identify one other device that would make up a life support system in any major hospital and explain its role in maintaining life. 2

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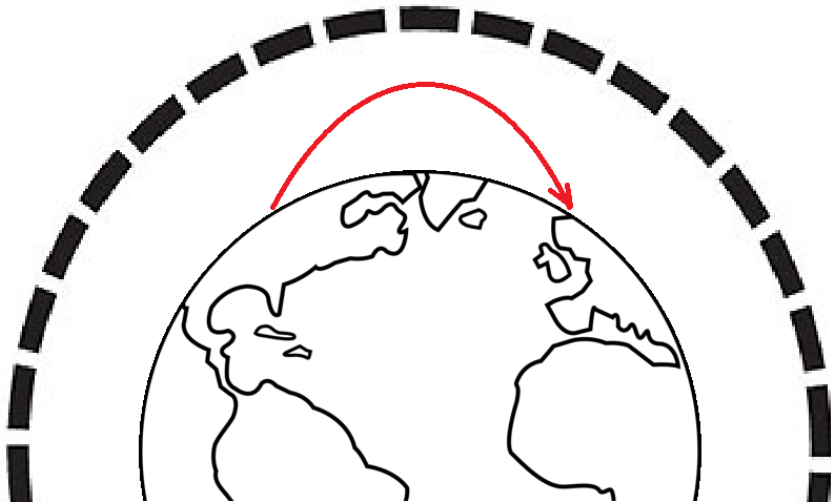
Question 24 (4 marks)

The use of non-invasive techniques or minimally invasive techniques has greatly reduced risks to patients and has increased our understanding of how the body works. Describe how this has occurred using specific examples. 4

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Question 25 (6 marks)

The diagram below was taken from a text book under the heading AM Radio Waves. The arrow represents the movement of the radio wave, the dotted line represents the ionosphere and the image in the centre represents the Earth.



a) Identify the errors in the diagram. 1

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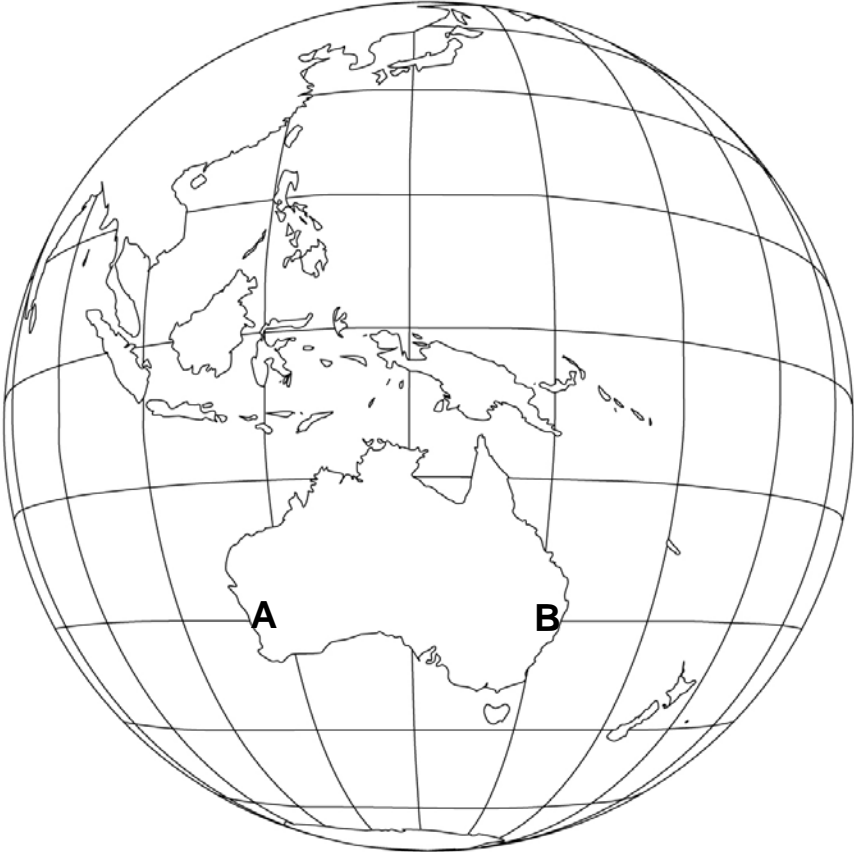
b) Explain why the errors make the diagram inaccurate. 2

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c) Draw the diagram correctly. 3

Question 26 (2 marks)

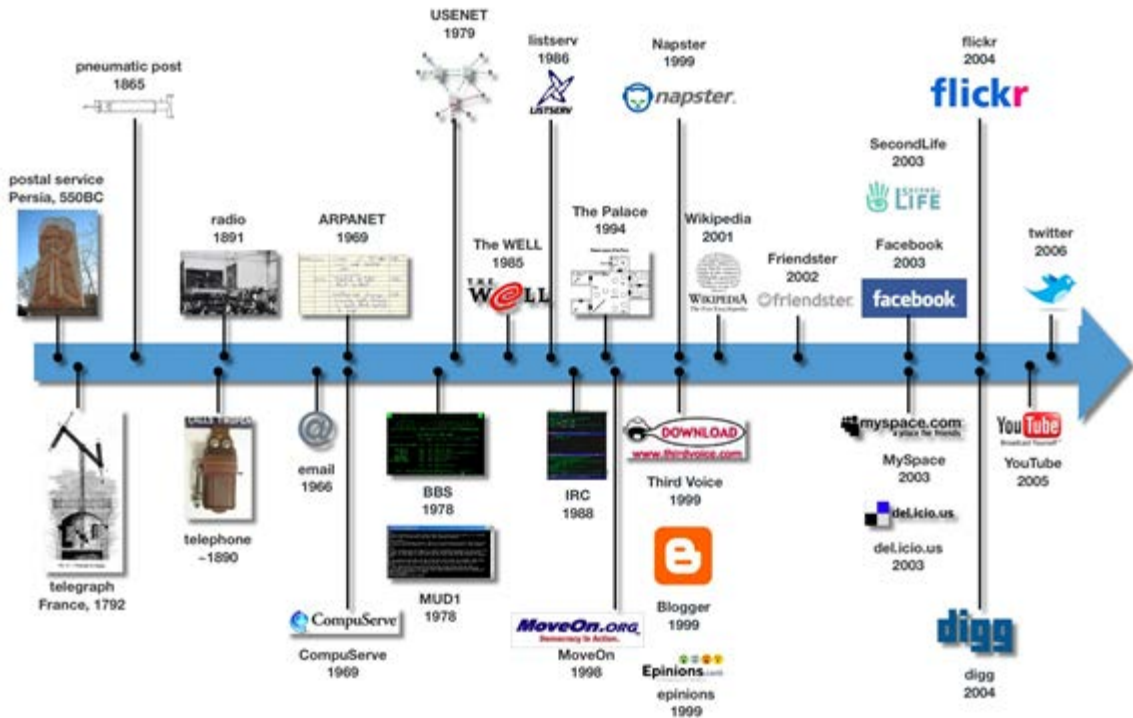
a. On the diagram provided, draw in the path of the electromagnetic waves to connect points A and B using fibre optic cables. 1



b. Two people at Point A are having a mobile phone call that uses a geostationary satellite. How far will the signal travel? 1

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Question 27 (6 marks)



a) Compare TWO different technologies from the timeline: one developed before 1900 and one developed after 1900. 2

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b) Explain how technologies such as Facebook, YouTube and Twitter have impacted society. 2

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c) Predict some possible future directions in communication technologies. 2

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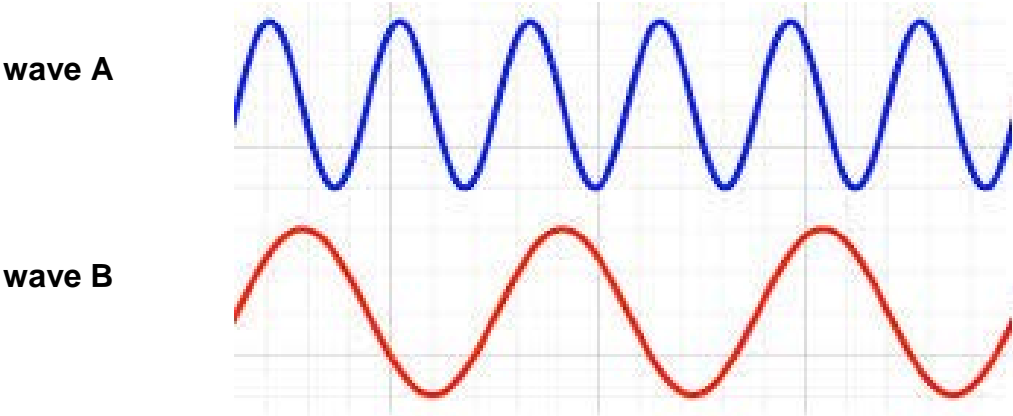
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Question 28 (3 marks)

Use the image below to answer the question:



a) Compare and contrast wave A and wave B.

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Question 29 (4 marks)

a) Explain why water OR alcohol is usually an ingredient in cosmetics or external medications. 2

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b) Identify **ONE** cosmetic product where *water* is a solvent and **ONE** where *alcohol* is a solvent. 2

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Question 30 (7 marks)

The following experiment was performed. The results are shown in the table below.

Aim: To determine the time it takes for substances in different mixtures to separate.

Method:

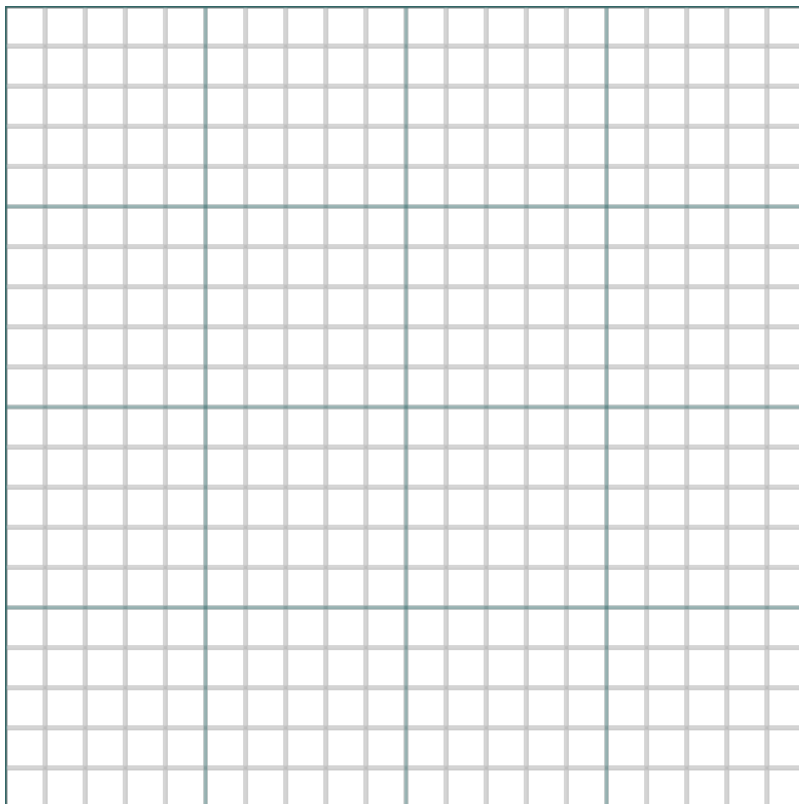
- i. Several mixtures were prepared and observed for two weeks.
- ii. These mixtures were observed.
- iii. The time taken for the substances **to begin to separate** was recorded.

Results:

Mixture	1	2	3	4	5	6	7	8	9
Time (hours)	1/2	No separation	4	36	44	No separation	2	48	18

a) Construct a column graph to represent the results above.

5



Question 30 continued over page

b) Based on the data in the table, identify the mixtures which are most likely suspensions. 1

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c) Identify a test that could be done to determine if the remaining mixtures are solutions or colloids. 1

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Question 31 (6 marks)

a. Identify a visible effect of washing hands too often. 1

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b. Explain how excessive hand washing could lead to a breach of the 1st line of defence. 3

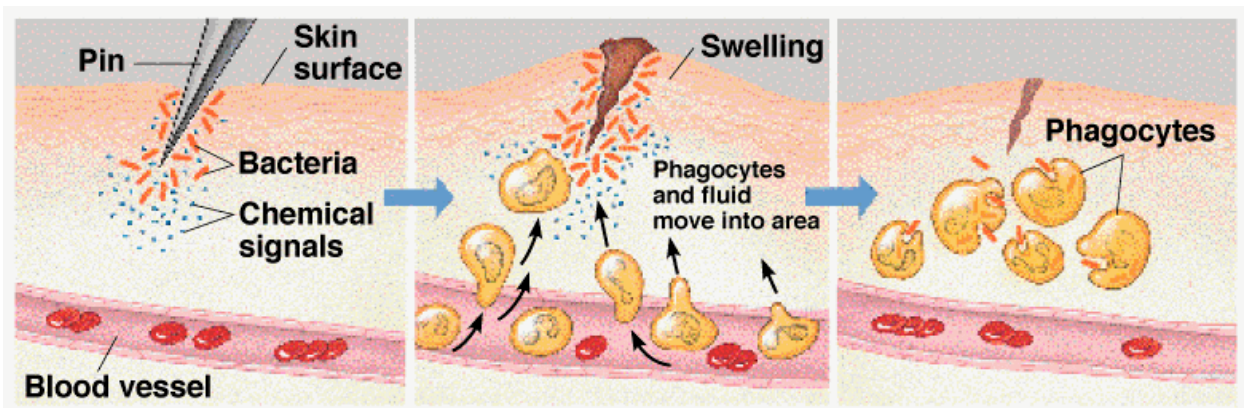
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c. Several companies promote Hand Sanitisers (eg. aquim, dettol) with the advertising that it destroys 99.99% of germs. Describe a negative of consequence of constantly using hand sanitiser? 2

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SECTION II**Total marks (25)****Attempt one option****Allow about 45 minutes for this part****Question 32****Answer questions a), b) and c) in Booklet 1.****Answer questions d), e) and f) in Booklet 2.****Answer question g) Booklet 3.**

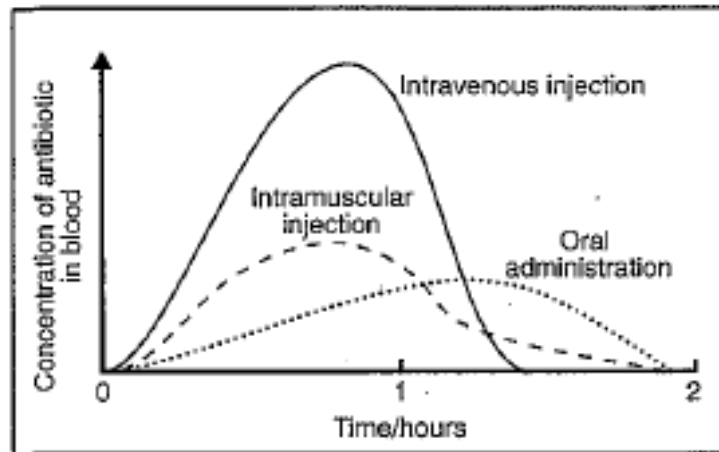
- a) Describe blood. 1
- b) Identify the 3 main types of blood vessels. 3
- c) Choose one of the blood vessels above and describe how its structure aids its function. 2
- d) Study the series of diagrams below and describe how and why the body responds in such a way by referring to each diagram. 6



- e) Identify the 3 main components of the nervous system. 3
- f) Draw a labelled diagram or flowchart to show the pathway of a reflex arc. 5

Question 32 is continued over page.

g) Study the diagram below;



i) Outline what the diagram is showing.

1

ii) Construct a table that compares advantages and/or disadvantages of intravenous injections, intramuscular injections and oral administration of drugs.

4

END OF EXAMINATION

SENIOR SCIENCE
YEAR 12 TRIAL HSC EXAMINATION 2014
ANSWER SHEET

General Instructions

- Write your Student Number at the top of this page.
 - Answer ALL multiple choice questions on this Answer Sheet.
 - Use a pencil to fill in the circle indicating your answer.
-

PART A

Start Here	1.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	2.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	3.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	4.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	5.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	6.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	7.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	8.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	9.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	10.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	11.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	12.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	13.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	14.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	15.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	16.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	17.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	18.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	19.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	20.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>



Pymble Ladies' College

TRIAL HSC EXAMINATION 2014

SENIOR SCIENCE

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Section I

75 marks

This section has two parts, Part A and Part B.

Part A – 20 marks

- Attempt questions 1 - 20
- Allow about 35 minutes for this part

Part B - 55 marks

- Attempt questions 21 - 32
- Allow about 1 hour and 40 minutes for this part

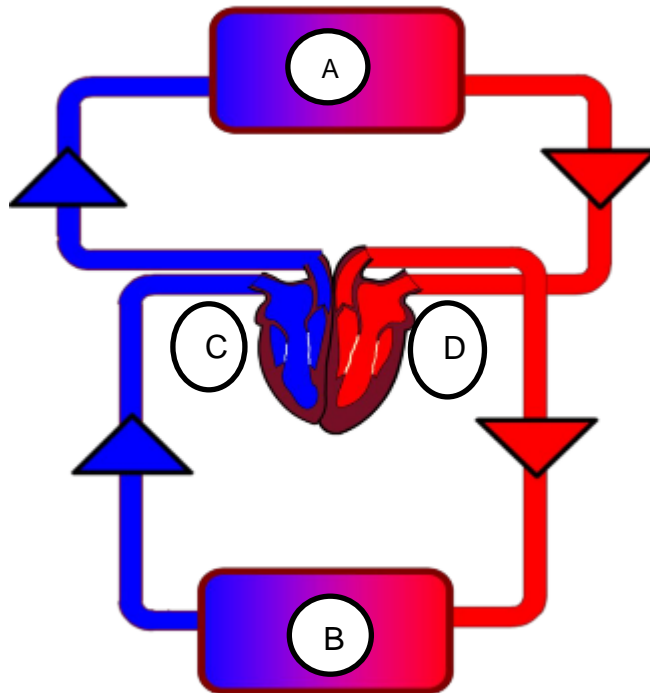
Section II

25 marks

- Question 32 is compulsory
- Allow about 45 minutes for this section

Section I (continued)**PART B****Total marks (55)****Attempt Questions****Allow about 1 hour and 40 minutes for this part.****Answer the questions in the spaces provided.****Question 21 (4 marks)**

The diagram shows the flow of blood into and out of the heart.



Explain the change in carbon dioxide levels in the different parts (A, B, C and D) of the diagram.

4

Marks	Criteria
4	Correctly describes and explains the changes to blood in terms of CO ₂ levels at points A, B, C, D.
3	Correctly describes and explains the changes to blood in terms of CO ₂ levels at points A, B, C, D.
2	Correctly describes and explains the changes to blood in terms of CO ₂ levels at points A, B, C, D.
1	Correctly describes and explains the changes to blood in terms of CO ₂ levels at points A, B, C, D.

Sample answer: A represents the lungs, this is the site of gas exchange and where the levels of CO₂ drop as it is exchanged with oxygen. The blood then moves to the left side of the heart (D) where the level of CO₂ remains fairly constant. It then moves to B which represents the body. Inside body cells respiration occurs and O₂ is used up whilst CO₂ is produce, as such the level of CO₂ in the blood rises. Blood then moves to the right die of the heart (C) where CO₂ remains the same before it is sent to the lungs again for gas exchange.

Question 22 (5 marks)

a) Identify **ONE** biomaterial or biomedical device that can be used to replace/repair a damaged bone. 1

Marks	Criteria
1	Correctly identifies a biomaterial or biomedical device.

Sample Answer: Silicon

b) Describe **TWO** properties of superalloys that make them suitable for hip replacements. 2

Marks	Criteria
2	Describes 2 properties of superalloys
1	Describes 1 property of superalloy

Sample Answer: Super alloys are biocompatible which means they do not react with the body and they have high tensile strength which means they are able to bear heavy loads.

c) Describe the differences between cemented and uncemented artificial implants. 2

Marks	Criteria
2	Correctly describes TWO differences between cemented and uncemented artificial implants by referring to both.
1	Correctly describes ONE difference between cemented and uncemented artificial implants.

Sample Answer:

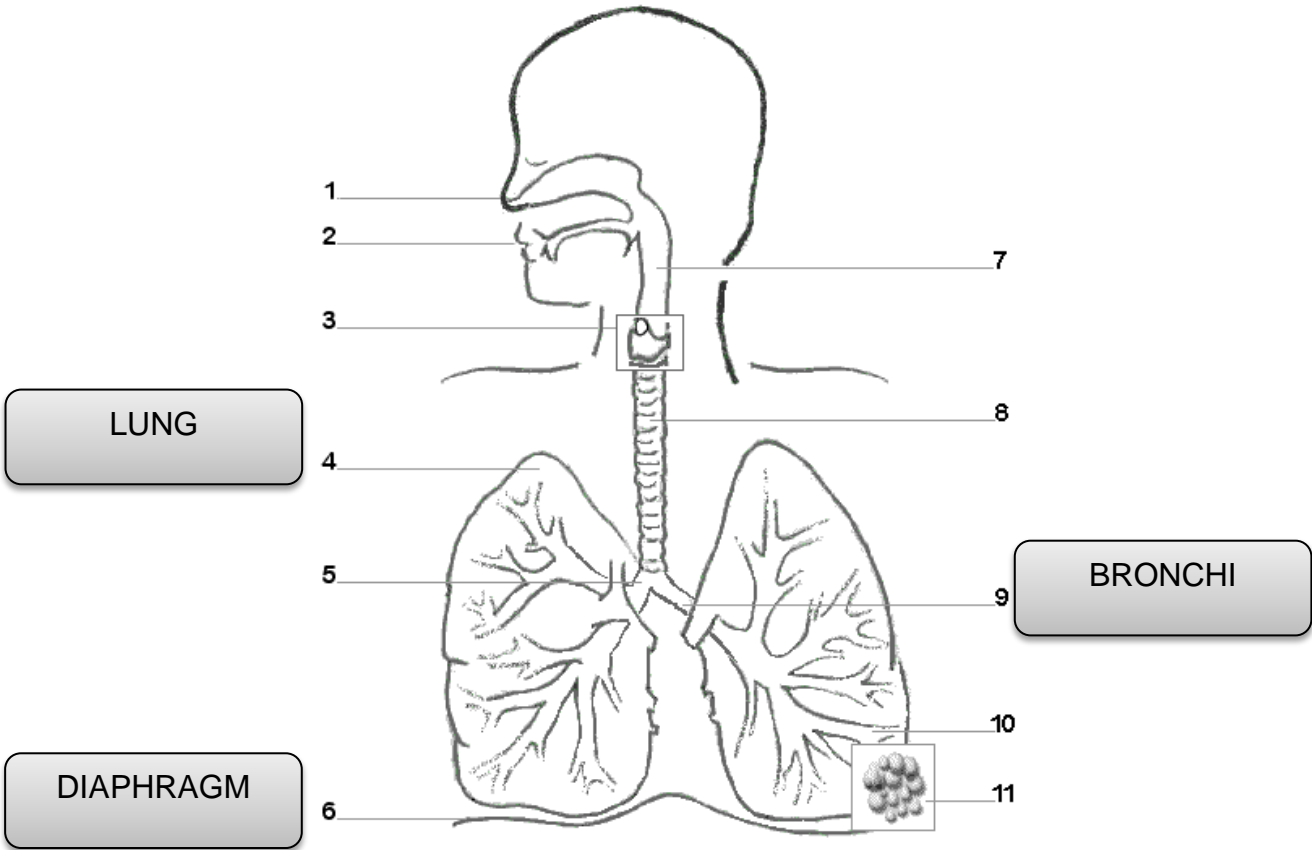
Cemented	Uncemented
Uses an adhesive eg cement or glue to hold implant in place	Does not use adhesive instead contains pores through which bone tissue can grow to hold implant in place
Short recovery time	Longer recovery time
Shorter lived implant – for use in elderly patients	Longer lived implant – for use in younger patients
Higher failure rate over time	Lower failure rate over time

Question 23 (8 marks)

a) Label the structures numbered **4, 6 and 9** on the diagram below:

3

Marks	Criteria
3	Correctly labels 3 structures
2	Correctly labels 2 structures
1	Correctly labels 1 structure



b) Identify the function of an artificial lung.

1

Marks	Criteria
1	Correctly identifies the role of an artificial lung

Sample Answer: An artificial lung carries out the process of gas exchange.

c) Discuss the type of operation that would require the use of an artificial lung.

2

Marks	Criteria
2	Correctly describes the type of operation and relates this to the fact that the blood would need oxygenation during this type of operation.
1	Correctly describes the type of operation OR refers to the fact that the blood would need oxygenation during this type of operation.

Sample Answer: A lung transplant would require the use of an artificial lung as the patients lungs are removed for a period of time before donor lungs are surgically attached. During this time gas exchange still needs to occur so that the body and brain are not starved of oxygen or build up too much carbon dioxide.

d) Identify one other device that would make up a life support system in any major hospital and explain its role in maintaining life.

2

Marks	Criteria
2	Correctly identifies a device and explains its use in saving life
1	Correctly identifies a device OR explains its use in saving life

Sample Answer: A defibrillator can be used to restart the heart if it stops or gets out of rhythm, which can starve the body/brain of oxygen and cause death.

Question 24 (4 marks)

The use of non-invasive techniques or minimally invasive techniques has greatly reduced risks to patients and has increased our understanding of how the body works. Describe how this has occurred using specific examples.

4

Marks	Criteria
4	Describes in detail how non-invasive and /or minimally invasive techniques have reduced risks and aided our understanding of the body using examples.
3	Describes how non-invasive and /or minimally invasive techniques have reduced risks and aided our understanding of the body using examples. OR Describes in detail how non-invasive and /or minimally invasive techniques have reduced risks and aided our understanding of the body.
2	Basically describes how non-invasive and /or minimally invasive techniques have reduced risks and aided our understanding of the body using examples. OR Describes how non-invasive and /or minimally invasive techniques have reduced risks and aided our understanding of the body.
1	Correctly describes a feature of non-invasive and /or minimally invasive techniques

Sample answer:

Non-invasive techniques such as x rays and MRI's have greatly reduced the risk patients are subjected to as they are used as diagnostic tools that enable 2-D and 3-D images of the body to be seen without the need of surgical procedure. This reduces the risk due to anaesthetic and exposure to infection whilst also providing enormous amounts of information about internal features and structures of the human body.

Minimally invasive techniques such as keyhole surgery also reduce the risk to patients by reducing the length of time patients are under anaesthetic, reduction of incision size and thus exposure to infection and a reduction in the time of recovery. The use of endoscopes during such surgery has also allowed surgeons to see structure whilst they are functioning inside the body and also responding to the surgery they have just performed.

Question 25 (6 marks)

The diagram below was taken from a text book under the heading AM Radio Waves. The arrow represents the movement of the radio wave, the dotted line represents the ionosphere and the image in the centre represents the Earth.



a) Identify the errors in the diagram.

1

Marks	Criteria
1	One of the following: Curved path of radio wave, radio wave not touching ionosphere, diagram not labelled

b) Explain why the errors make the diagram inaccurate.

2

Marks	Criteria
2	Radio waves travel in straight lines and AM radio waves are reflected by the ionosphere
1	One of the above

Sample answer: Radio waves travel in straight lines, not a curved path. AM radio waves are reflected by the ionosphere, not in the space between the surface of the Earth and the ionosphere.

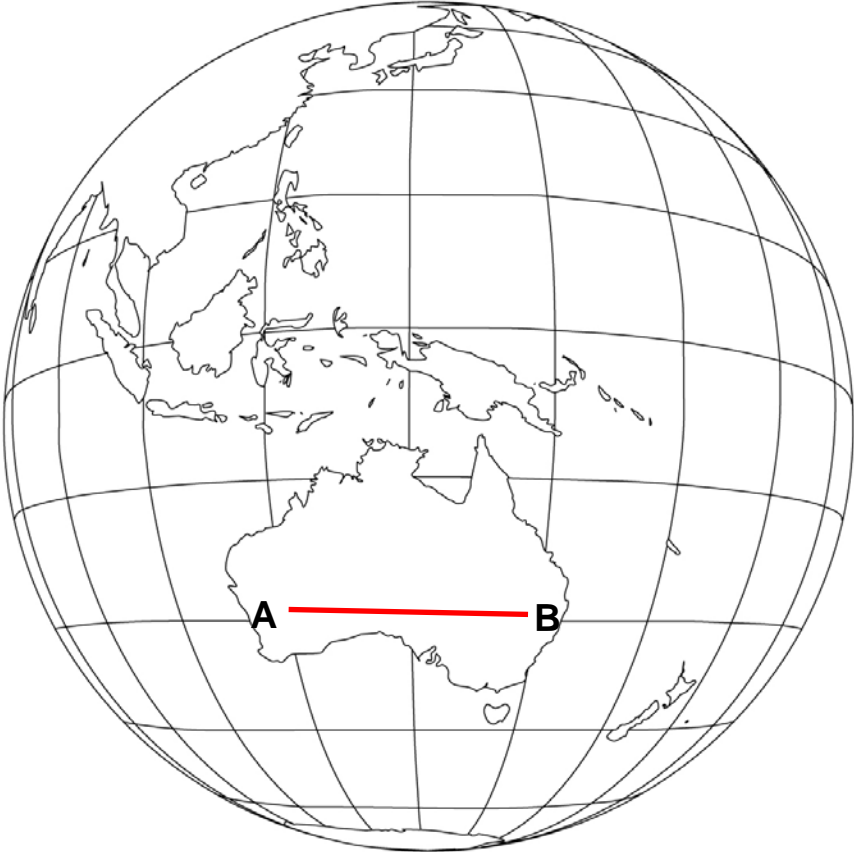
c) Draw the diagram correctly.

3

Marks	Criteria
3	AM wave drawn as a straight line Radio wave reflects off the ionosphere Diagram labelled (Earth, ionosphere and radiowave)
2	One error
1	Two errors

Question 26 (2 marks)

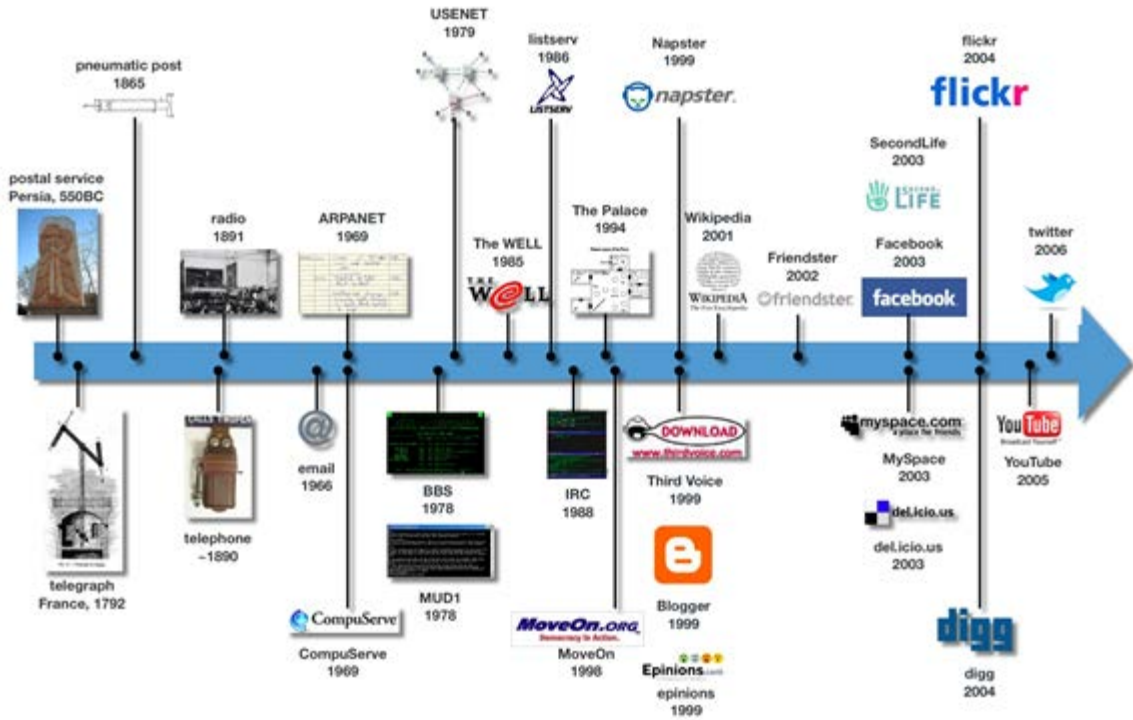
a. On the diagram provided, draw in the path of the electromagnetic waves to connect points A and B using fibre optic cables. 1



b. Two people at Point A are having a mobile phone call that uses a geostationary satellite. How far will the signal travel? 1

Marks	Criteria
1	72,000km

Question 27 (6 marks)



a) Compare TWO different technologies from the timeline: one developed before 1900 and one developed after 1900. 2

Marks	Criteria
2	Successfully compared two different technologies – one from before 1900, one after 1900 many possible answers
1	One of the above

Sample answer:

The postal service in Persia (550BC) delivered written mail from sender to recipient. The delivery time could range from days to weeks for the message to be received.
Facebook (2003) instantly delivers verbal and non-verbal messages between people anywhere in the world.

b) Explain how technologies such as Facebook, YouTube and Twitter have impacted society. 2

Marks	Criteria
2	Two points relating to society; Worldwide connection, immediate response by recipient of information, can be used maliciously, employment
1	One point relating to society

Sample answer:

These allow instant upload of information (visual, verbal, written etc.) to a worldwide audience. Allows immediate response by recipient of information. Like all technology can be used maliciously and can impact on available time, relationships, etc.

c) Predict some possible future directions in communication technologies.

2

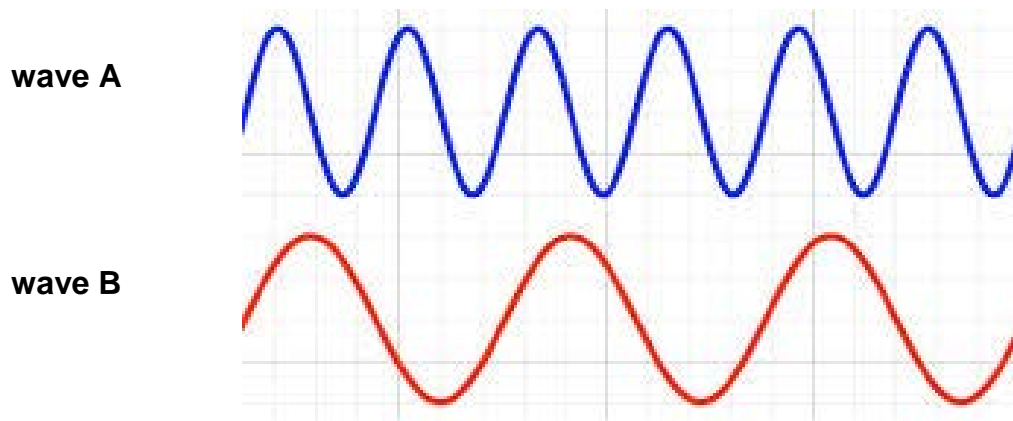
Marks	Criteria
2	Includes any TWO future directions – integration, miniaturisation, mobility, cloud based, etc.
1	One of the above

Sample answer:

Future directions in communication technologies could include integration of systems, such as linking your mobile phone's physical location with the news relevant to the area, or holographic projections of the person you are communicating with. Mobile phones could become smaller. Technology will become more mobile allowing us to have more freedom of movement whilst we communicate.

Question 28 (3 marks)

Use the image below to answer the question:



a) Compare and contrast wave A and wave B.

3

Marks	Criteria
3	Can be done in table or written (2) frequency / wavelength different (1) amplitude the same
2	Missing one of the above
1	Missing two of the above

Sample answer:

Waves A and B both have the same amplitude. Wave A has a higher frequency and shorter wavelength whilst wave B has a lower frequency and longer wavelength.

Also accepted:

Both waves could be considered carrier waves with their consistent pattern and no modulation evident.

Question 29 (4 marks)

a) Explain why water OR alcohol is usually an ingredient in cosmetics or external medications.

2

Marks	Criteria
2	Answer to include TWO of the following: (1) Both solvents are made up of polar molecules and so will dissolve a wide range of substances (1) Both have a neutral pH and so will not affect the pH of the mixture (1) Alcohol will dissolve some substances that water cannot (1) Alcohol has a cooling effect on the skin as it evaporates at a lower temperature than water
1	One of the above

b) Identify **ONE** cosmetic product where *water* is a solvent and **ONE** where *alcohol* is a solvent.

2

Marks	Criteria
2	Water as a solvent – any conditioner, shampoo, moisturiser, etc. Alcohol as a solvent – some antiseptics, perfumes, hair sprays, facial toner and aftershave, etc.
1	One of the above

Question 30 (7 marks)

The following experiment was performed. The results are shown in the table below.

Aim: To determine the time it takes for substances in different mixtures to separate.

Method:

- i. Several mixtures were prepared and observed for two weeks.
- ii. These mixtures were observed.
- iii. The time taken for the substances **to begin to separate** was recorded.

Results:

Mixture	1	2	3	4	5	6	7	8	9
Time (hours)	1/2	No separation	4	36	44	No separation	2	48	18

a) Construct a column graph to represent the results above.

5

Marks	Criteria
5	1 mark for each: title, axes, units, columns used, points plotted correctly and made reference to mixture 2 and 6 not separating
4	Missing one of the above
3	Missing two of the above
2	Missing three of the above
1	Missing four of the above

b) Based on the data in the table, identify the mixtures which are most likely suspensions.

1

Marks	Criteria
1	1, 3 and 7 (also accepted 9)

c) Identify a test that could be done to determine if the remaining mixtures are solutions or colloids.

1

Marks	Criteria
1	Solutions are clear and transparent (no Tyndall effect) Colloids are cloudy (but uniform and homogenous) and they will scatter light

Question 31 (6 marks)

- a. Identify a visible effect of washing hands too often. 1

Marks	Criteria
1	Dry hands

- b. Explain how excessive hand washing could lead to a breach of the 1st line of defence. 3

Marks	Criteria
3	Three good points; Skin is only effective if unbroken and intact Dry skin cracks Cracked skin could allow pathogens into the body (or other suitable point)
2	Two good points
1	One good point

Sample answer:

Excessive hand washing can leave the skin dry and brittle. Skin is only an effective barrier if it is intact and unbroken. If the dry skin cracks, it could then allow pathogens into the body, bypassing the 1st line of defence.

Also accepted:

Removing the microflora from the surface of the skin will have a negative effect as the skin will not be as inhospitable to pathogens as it usually is. The natural microflora keep the skin slightly acidic (ph = 5.5) and take up space and resources on the skin which then make it difficult for the pathogens to colonise and multiply.

- c. Several companies promote Hand Sanitisers (eg. aquim, dettol) with the advertising that it destroys 99.99% of germs. Describe a negative of consequence of constantly using hand sanitiser? 2

Marks	Criteria
2	Two good points;
1	One good point

Sample answer:

Hand sanitisers are effective at removing all germs, along with the natural microflora.

Natural microflora keep the skin healthy, which keeps out potentially harmful pathogens

Also accepted:

Constant use of hand sanitiser will provide pathogens the opportunity to become accustomed to and no longer responsive to the product. This could lead to the rise of ABRB (antibiotic resistant bacteria).

SECTION II

Total marks (25)

Attempt one option

Allow about 45 minutes for this part

Question 32

Answer questions a), b) and c) in Booklet 1.

Answer questions d), e) and f) in Booklet 2.

Answer question g) Booklet 3.

a) Describe blood.

1

Marks	Criteria
1	Correctly describes blood (should state what it consists of).

Sample answer:

Blood is a mixture of red blood cells, white blood cells, platelets and plasma.

b) Identify the 3 main types of blood vessels.

3

Marks	Criteria
3	Correctly identifies arteries, veins and capillaries.
2	Correctly identifies 2 of the above.
1	Correctly identifies one of the above.

Sample answer:

Arteries, veins and capillaries.

c) Choose one of the blood vessels above and describe how its structure aids its function.

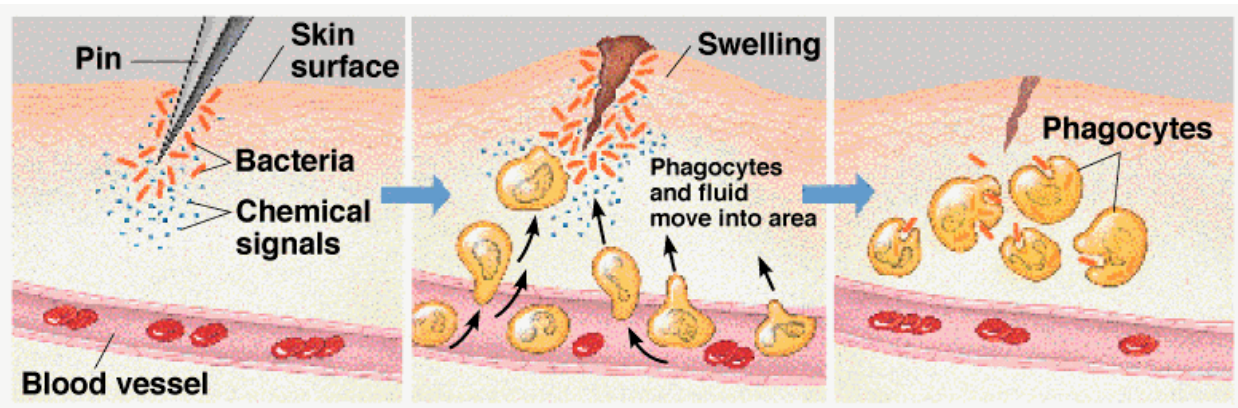
2

Marks	Criteria
2	Correctly describes the structure and function of a blood vessel.
1	Correctly describes the structure OR function of a blood vessel.

Sample answer: Veins contain one way valves which allows the one way movement of blood through the body.

d) Study the series of diagrams below and describe how and why the body responds in such a way by referring to each diagram.

6



Marks	Criteria
6-5	Thorough description of what is happening in each diagram and why it is happening.
4-3	Thorough description of what is happening in TWO diagrams and why it is happening. OR Basic description of what is happening in each diagram.
	Thorough description of what is happening in ONE diagram and why it is happening. OR Basic description of what is happening in TWO diagrams. OR States facts about the immune response.
2-1	States facts about the immune response.

Sample answer:

Diagram 1 shows a pin entering the body which is a breach of the first line of defence, allowing bacteria into the body. This triggers chemicals such as histamines and prostaglandins which cause pain and stimulate the immune response.

Diagram 2 shows increased permeability of the blood vessels caused by dilation. This allows greater blood flow to the area which induces swelling. The greater blood flow allows phagocytes to get to the area and move out through pores in the capillaries to the trauma site.

Diagram 3 shows that the phagocytes have engulfed the bacteria stopping them from moving deeper into the body. Swelling has also decreased and sealing of the skin is occurring further preventing the entrance of bacteria.

e) Identify the 3 main components of the nervous system.

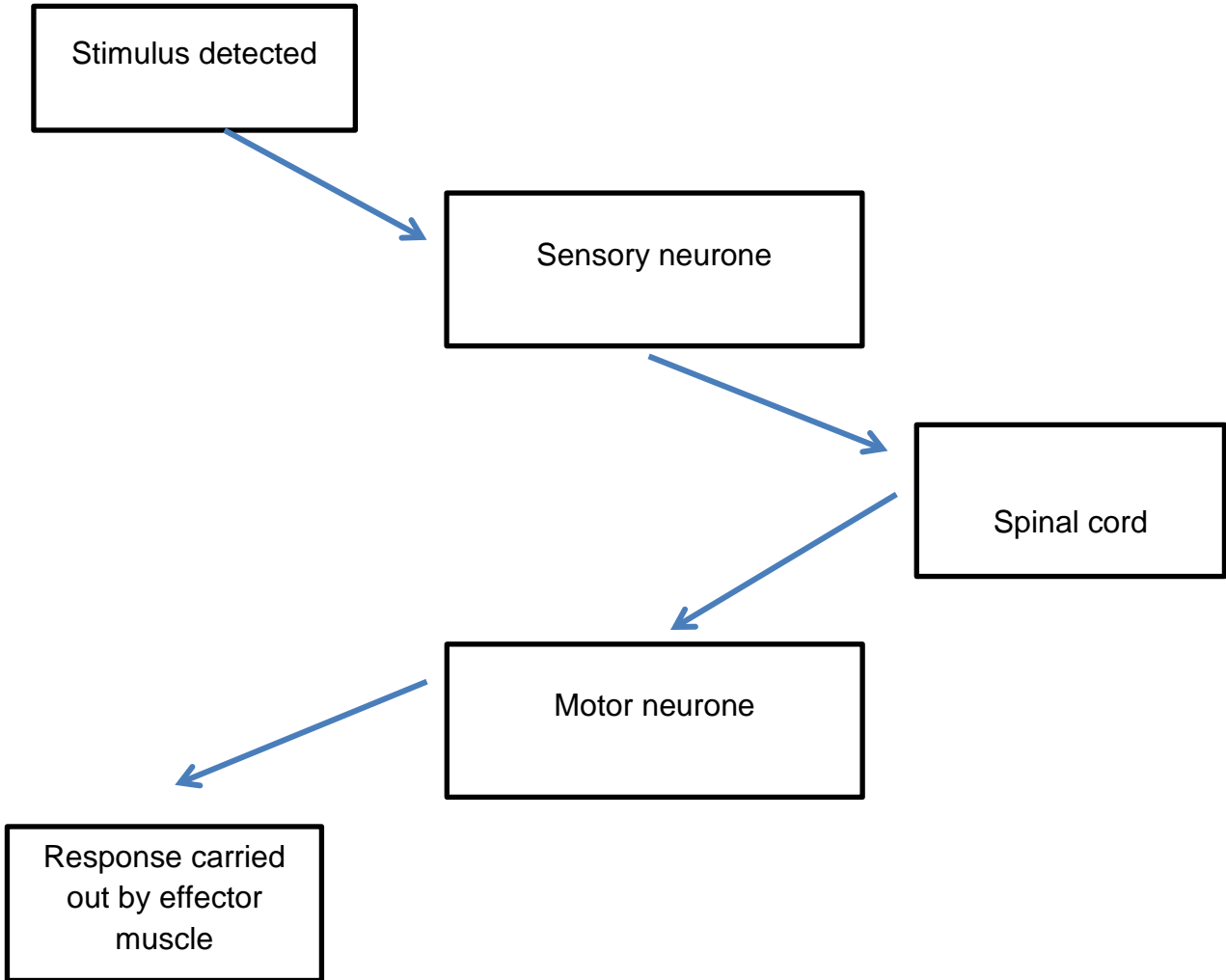
3

Marks	Criteria
3	Identifies brain, spinal cord and peripheral nerves.
2	Identifies 2 of: brain, spinal cord and peripheral nerves.
1	Identifies 1 of: brain, spinal cord and peripheral nerves.

Sample answer: Brain, spinal cord and peripheral nerves

f) Draw a labelled diagram or flowchart to show the pathway of a reflex arc.

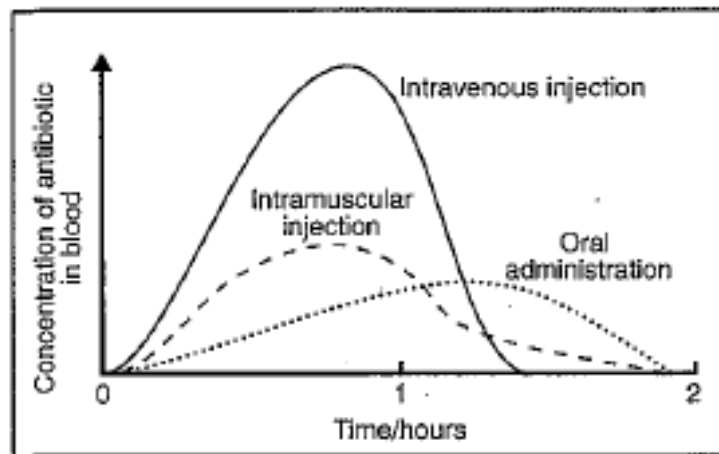
5



Marks	Criteria
5	Correctly shows the 5 step pathway in diagrammatic form, showing the correct steps, using correct terminology and in correct sequence.
4	Correctly shows the 5 steps pathway in diagrammatic form showing the correct steps but may not be using correct terminology OR in correct sequence.
3	Shows the pathway in diagrammatic form, showing some of the correct steps, using some correct terminology and mostly in correct sequence.
2	Shows some of the pathway in diagrammatic form.
1	Shows some correct information in regard to reflex arcs.

Sample answer:

g) Study the diagram below;



i) Outline what the diagram is showing.

1

Marks	Criteria
1	States that it shows the concentration of antibiotic in blood over time using three different delivery methods.

Sample answer:

Concentration of antibiotic in blood over time using three different delivery methods.

ii) Construct a table that compares advantages and/or disadvantages of intravenous injections, intramuscular injections and oral administration of drugs.

4

Marks	Criteria
4	Correctly constructs a table with sensible headings containing correct information in each row.
3	Correctly constructs a table with sensible headings containing mostly correct information in each row. OR Constructs a mostly correct table containing correct information in each row.
2	Correctly constructs a table with sensible headings OR correctly gives information.
1	Correctly states some correct information.

Sample answer:

	METHOD OF DRUG DELIVERY		
	INTRAVENOUS	INTRAMUSCULAR	ORAL
ADVANTAGES	fast acting	reasonably fast acting	easy to administer
DISDVANTAGES	doctor needed to administer	doctor needed to administer	slow acting

SENIOR SCIENCE**YEAR 12 TRIAL HSC EXAMINATION 2014****ANSWER SHEET****General Instructions**

- Write your Student Number at the top of this page.
- Answer ALL multiple choice questions on this Answer Sheet.
- Use a pencil to fill in the circle indicating your answer.

PART A

Start Here	1.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input checked="" type="radio"/>	D	<input type="radio"/>
	2.	A	<input type="radio"/>	B	<input checked="" type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	3.	A	<input checked="" type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	4.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	5.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input checked="" type="radio"/>	D	<input type="radio"/>
	6.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	7.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	8.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	9.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input checked="" type="radio"/>	D	<input type="radio"/>
	10.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	11.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input checked="" type="radio"/>	D	<input type="radio"/>
	12.	A	<input type="radio"/>	B	<input checked="" type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	13.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	14.	A	<input type="radio"/>	B	<input checked="" type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	15.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	16.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	17.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input type="radio"/>	D	<input checked="" type="radio"/>
	18.	A	<input type="radio"/>	B	<input checked="" type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	19.	A	<input type="radio"/>	B	<input checked="" type="radio"/>	C	<input type="radio"/>	D	<input type="radio"/>
	20.	A	<input type="radio"/>	B	<input type="radio"/>	C	<input checked="" type="radio"/>	D	<input type="radio"/>