

# IGCSE

## Human Biology

Sample Assessment  
Materials (SAMs)

### Edexcel IGCSE in Human Biology (4HB0)

First examination 2011

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#### *Acknowledgements*

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## Introduction

These sample assessment materials have been prepared to support the specification.

The aim of these materials is to provide students and centres with a general impression and flavour of the actual question papers and mark schemes in advance of the first operational examinations.



## Sample question papers

Human Biology Paper 1

7

Human Biology Paper 2

35





Centre No.					Paper Reference					Surname	Initial(s)	
Candidate No.					<b>4</b>	<b>H</b>	<b>B</b>	<b>0</b>	<b>/</b>	<b>0</b>	<b>1</b>	Signature

Paper Reference(s)

**4HB0/01**

**Edexcel IGCSE**

**Human Biology**

**Human Biology Paper 1**

**Sample Assessment Material**

**Time: 2 hours**

Examiner's use only

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Team Leader's use only

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Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

Materials required for examination  
Nil

Items included with question papers  
Nil

**Instructions to Candidates**

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature. Check that you have the correct question paper. Answer ALL the questions. Write your answers in the spaces provided in this question paper. Some questions must be answered with a cross in a box (). If you change your mind about an answer, put a line through the box () and then mark your new answer with a cross (.

**Information for Candidates**

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2). There are 10 questions in this question paper. The total mark for this paper is 120. There are 28 pages in this question paper. All blank pages are indicated.

**Advice to Candidates**

Write your answers neatly and in good English.

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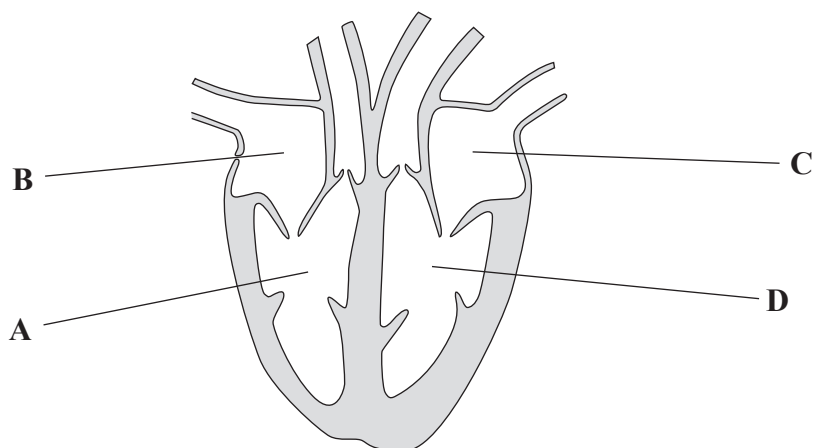
Turn over



**Answer ALL questions.**

1. For each of the questions (a) to (j), choose an answer A, B, C, D and put a cross (☒) in the box. Mark only one answer for each question. If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

(a) The diagram shows a section through the human heart.



Which chamber pumps oxygenated blood to the body?

- A
- B
- C
- D

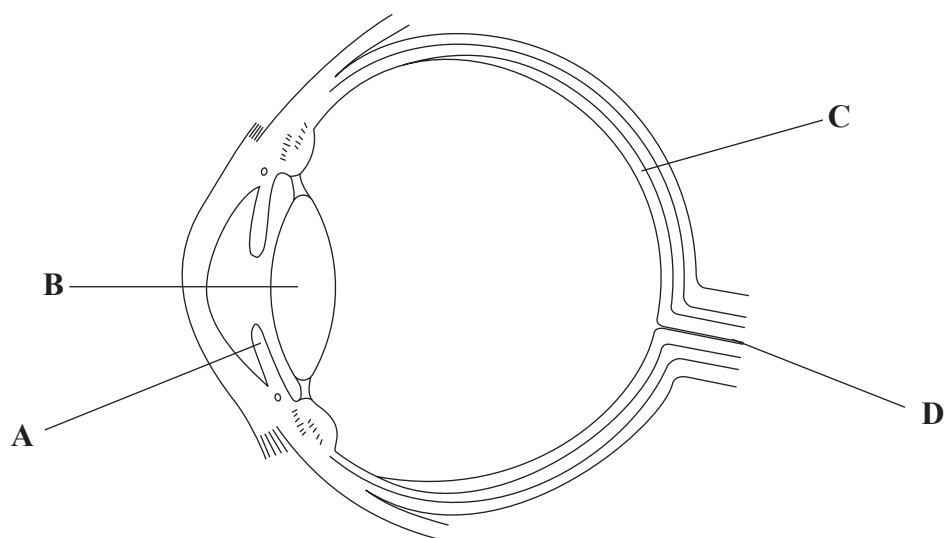
**(1)**

(b) Which process do plants use to make their food from sunlight?

- A diffusion
- B osmosis
- C photosynthesis
- D respiration

**(1)**

(c) The diagram shows a section of the human eye.



Which part of the eye detects light?

- A
- B
- C
- D

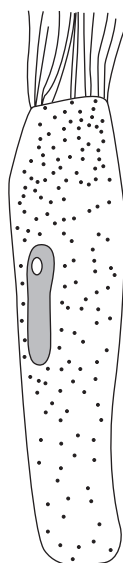
(1)

(d) In which of the following structures does the human foetus usually grow and develop?

- A vagina
- B uterus
- C oviduct
- D ovary

(1)

(e) The diagram shows a cell from the human body.

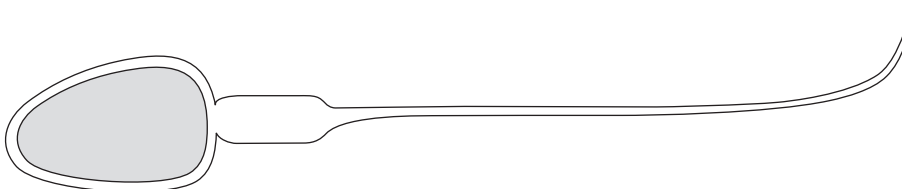


In which part of the body would this type of cell be found?

- A skin
- B lining of a blood vessel
- C lining of the trachea
- D brain

(1)

(f) The diagram shows a cell made in the human body.



Name the type of cell.

- A sperm
- B ovum
- C neurone
- D muscle

(1)

(g) Follicle-stimulating hormone (FSH) is made by which of the following structures?

- A testis
- B liver
- C pituitary gland
- D adrenal gland

(1)

(h) Which of the gases is given out by car exhausts **and** is poisonous?

- A carbon monoxide
- B methane
- C nitrogen
- D CFCs

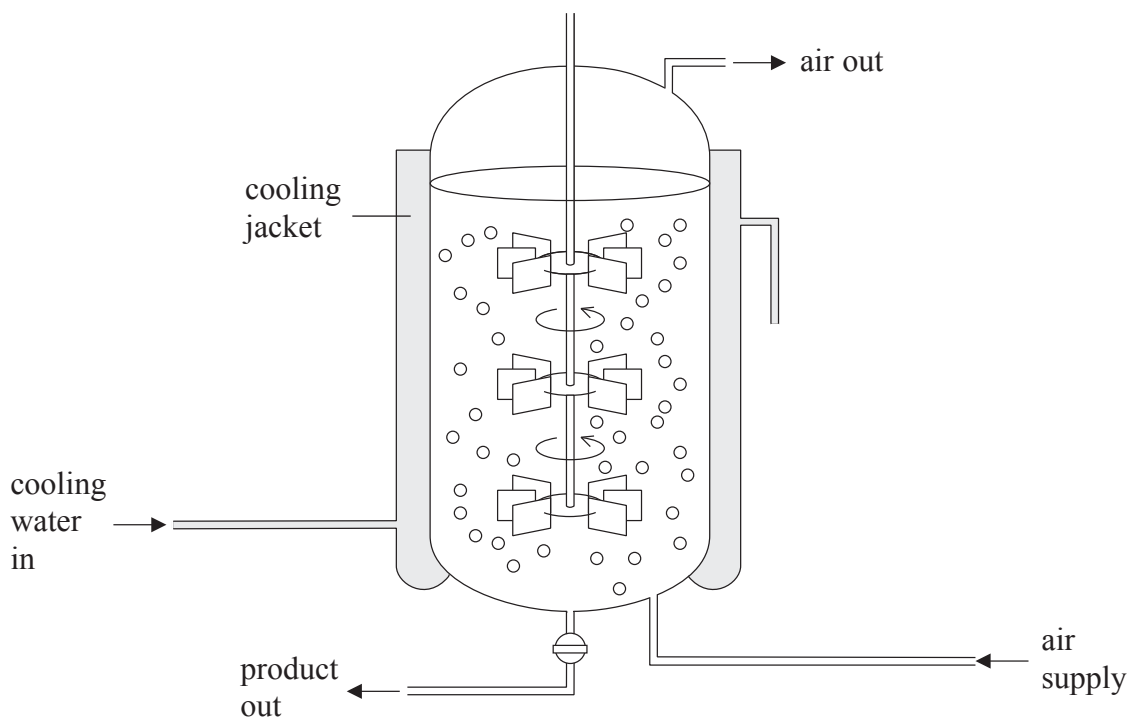
(1)

(i) Which structure in the human body excretes carbon dioxide?

- A liver
- B lungs
- C kidney
- D skin

(1)

(j) The diagram shows a fermenter which is used to grow fungi which can produce a substance that can kill other fungi.



What is the name of this type of substance?

- A disinfectant
- B antiseptic
- C drug
- D antibiotic

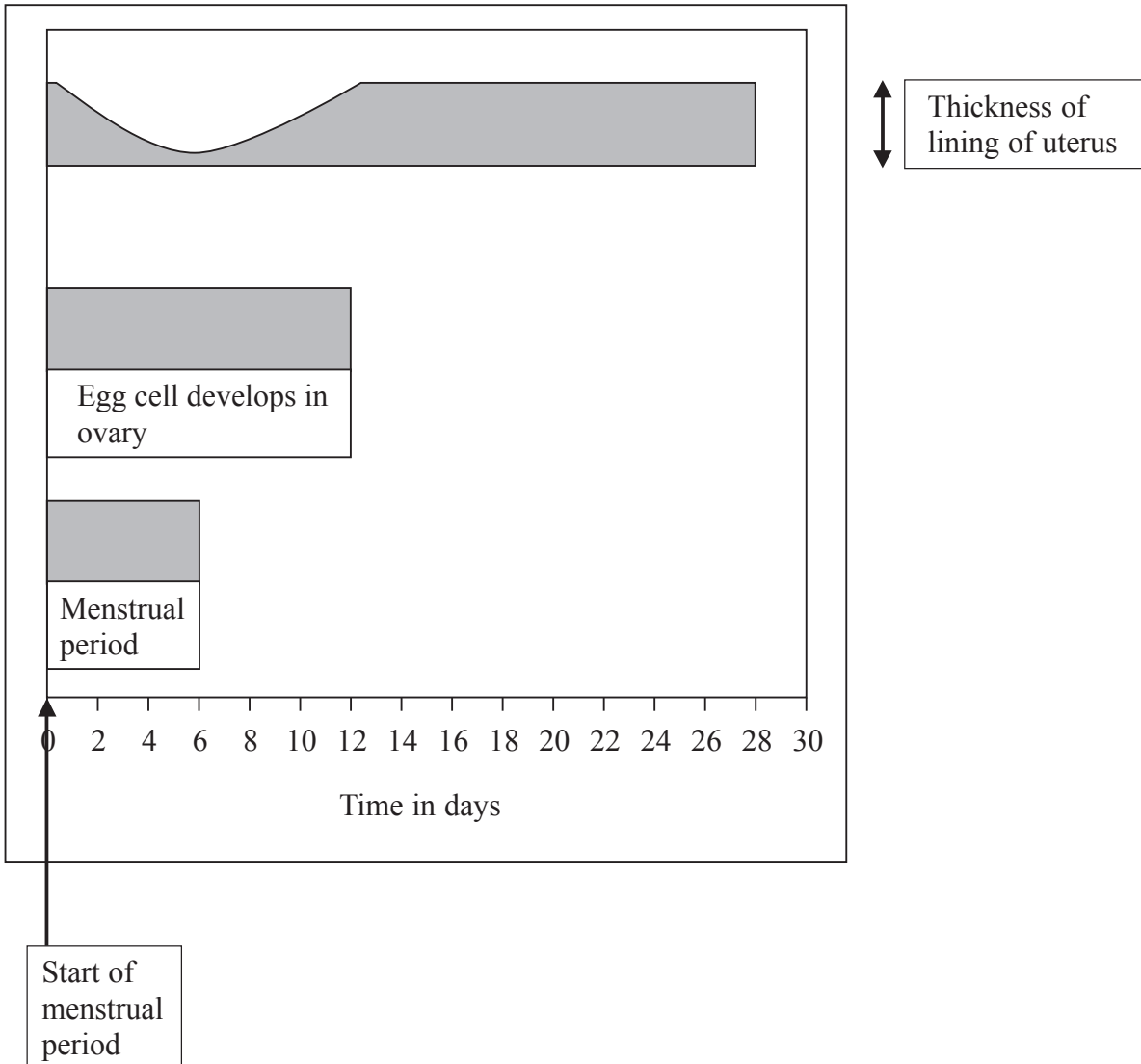
(1)

Q1

(Total 10 marks)

--	--

2. The diagram shows the variation in the thickness of the lining of the uterus and some of the events during the menstrual cycle.



(a) (i) During which days is the lining of the uterus decreasing in thickness?

.....  
.....  
(1)

(ii) Describe what is happening to this lining.

.....  
.....  
(1)

(iii) During which days is the lining at its thickest?

.....  
.....  
**(1)**

(iv) Give **three** reasons for the lining being thick during this time.

1 .....  
.....  
2 .....  
.....  
3 .....  
.....  
**(3)**

(b) Explain on which days of the cycle pregnancy is unlikely to occur.

.....  
.....  
.....  
.....  
.....  
.....  
**(4)**

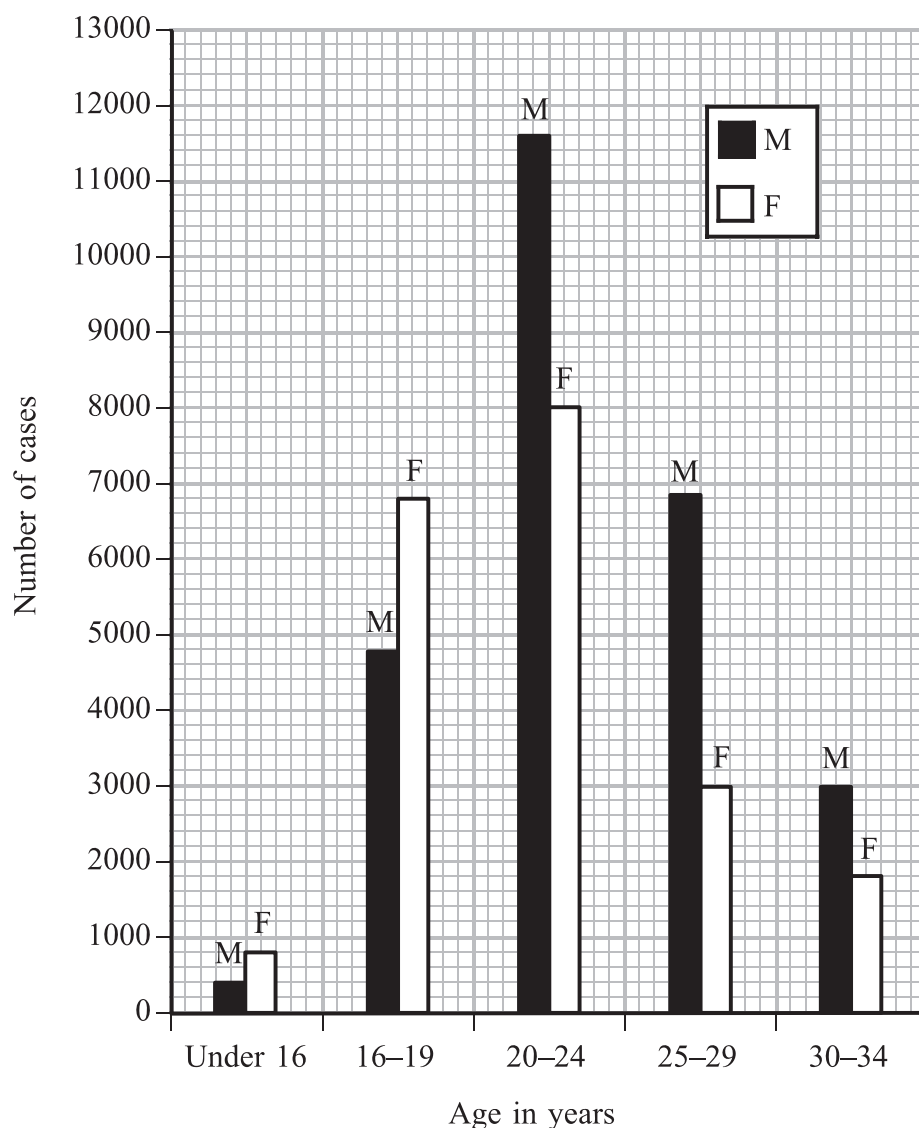
**(Total 10 marks)**

**Q2**

--	--



3. (a) The bar chart shows the number of cases of the sexually transmitted disease, gonorrhoea, affecting people of different ages in a country in one year.



- (i) How many cases of the disease were there during the year in men aged 30-34?

..... (1)

- (ii) How many cases of the disease were there during the year in women aged 20-24?

..... (1)

(iii) Which age group has the greatest number of cases of the disease in males and females?

.....  
(1)

(iv) Suggest **one** reason for this age group having the greatest number of cases.

.....  
(1)

(b) (i) Name **one** other sexually transmitted disease.

.....  
(1)

(ii) State **three** ways in which the spread of gonorrhoea can be reduced.

1 .....

.....

2 .....

.....

3 .....

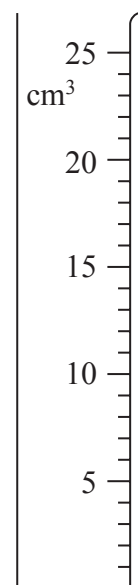
.....  
(3)

(Total 8 marks)

Q3

4. A student tests some food samples for protein.

(a) He uses the piece of apparatus shown below to measure the reagent.



(i) Name this piece of apparatus.

..... (1)

(ii) He measures out 3 cm<sup>3</sup> of the reagent.

Draw a line on the diagram to show the level of the reagent. (1)

(b) The student tested two foods, **A** and **B**, for protein.

(i) Name a reagent he could use.

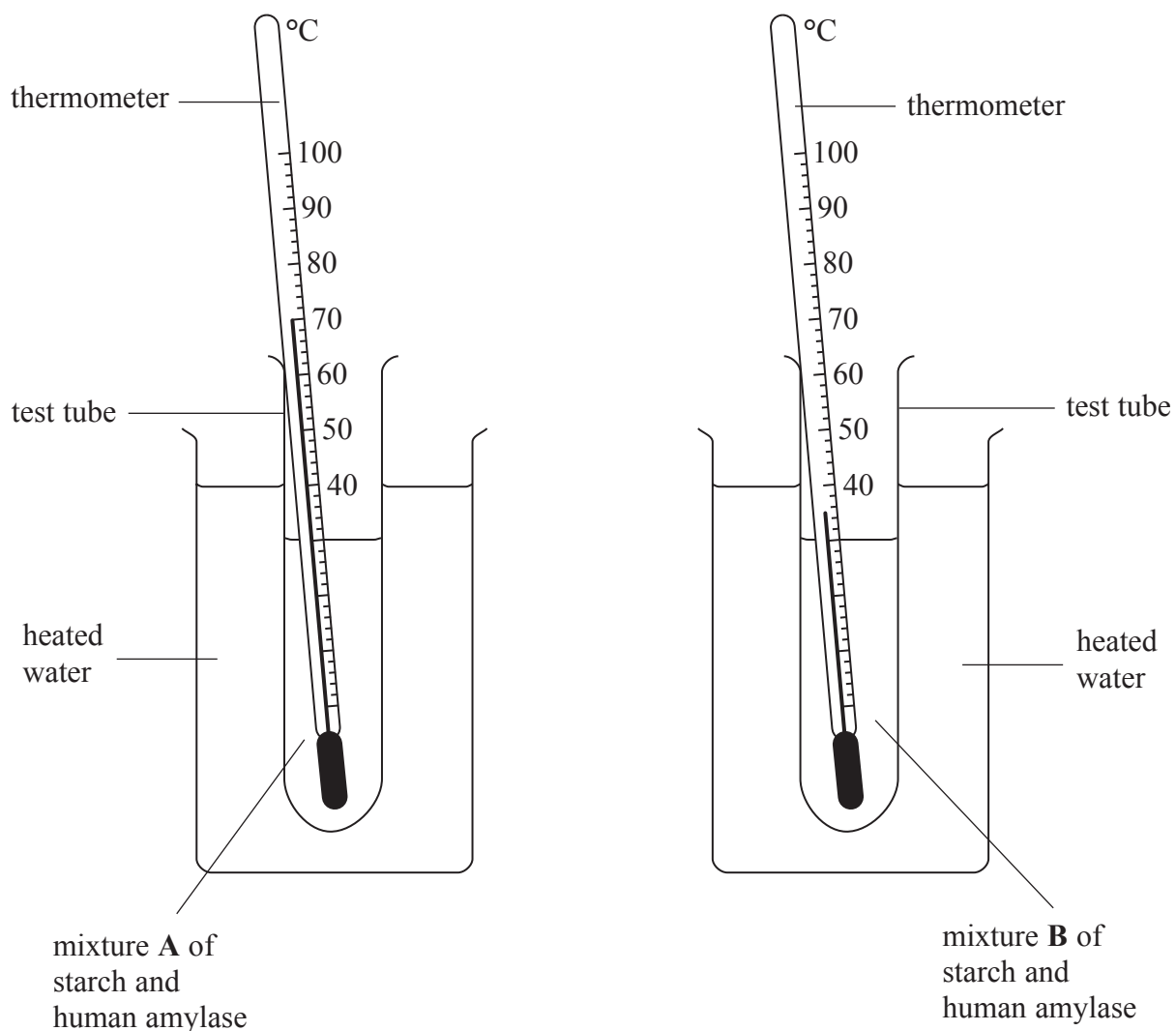
..... (1)

(ii) He obtained the following results. Complete the table below to show the colours obtained.

Food	Colour	Conclusion
A		no protein
B		protein present

(2)

(c) The diagrams below show the apparatus used by a student to investigate the digestion of starch at two different temperatures.



(i) What is the temperature at which each starch and human amylase mixture is being incubated?

**A**.....

**B**.....

(2)

- (ii) The student removed a small sample of the starch and amylase mixture from each test tube every two minutes. Each sample was tested for the presence of starch.

The student wished to show the results of the tests in the form of a table. Draw a table, with the correct headings, that will allow the student to record his test results.

(4)

- (iii) State in which of the two mixtures the starch would be digested most quickly and explain why.

.....

.....

.....

.....


(3)

Q4


(Total 14 marks)

--	--

5. (a) Some people carry donor cards like the one shown.



### Organ /Tissue Donor Card



I wish to donate my organs and tissues. I wish to give:

any needed organs or tissues   
  only the following organs and tissues:
   
 \_\_\_\_\_

Donor  
 Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Witness \_\_\_\_\_  
 Witness \_\_\_\_\_

This means that when they die, their body parts can be given to people that need them.

The table gives the function of body parts that are commonly donated. Complete the table using words from the list.

- cornea      heart      kidney      lung**  
**pancreas      skin      liver**

Function	Donated body part
breaks down toxic chemicals	
fills with air during breathing	
bends light as it enters eye	
secretes insulin	

(4)

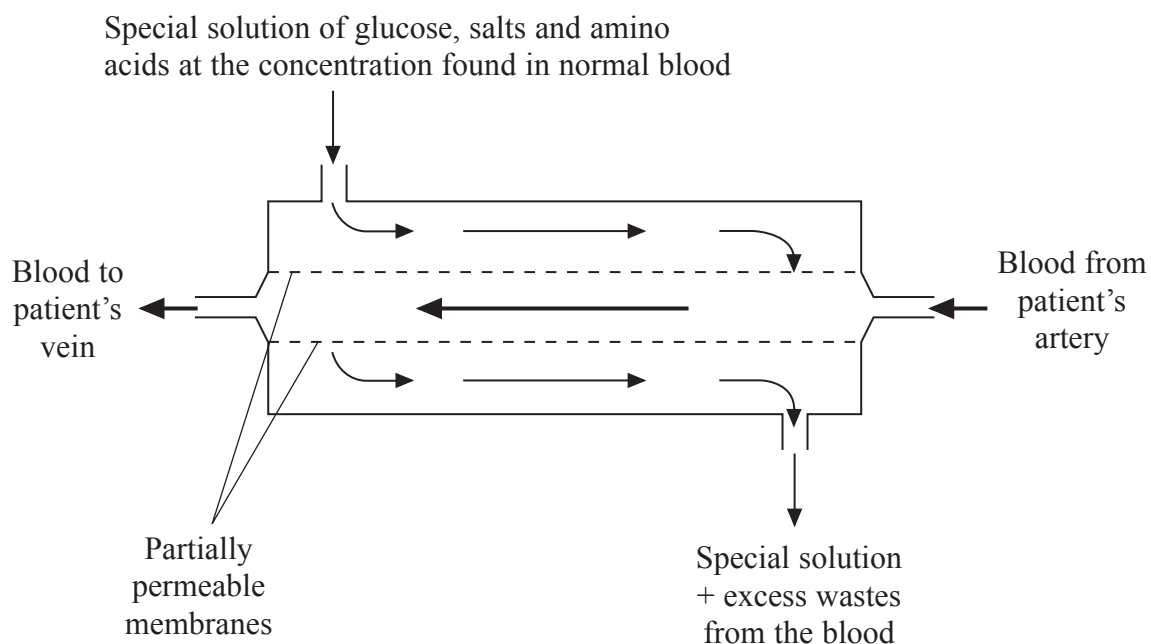
(b) (i) Name the final fluid produced by a normal kidney.

..... (1)

(ii) Name the blood vessel that supplies oxygenated blood to the normal kidney.

..... (1)

(c) A person who suffers kidney failure may be treated every few days by dialysis. This uses an artificial kidney machine. The diagram shows the working of a kidney machine. In this machine a special solution flows round the outside of an inner tube which carries the patient's blood.



(i) Name **one** of the excess wastes leaving the apparatus in the special solution.

.....  
**(1)**

(ii) Explain why the contents of the special solution entering the apparatus must be at the same concentration as found in normal blood.

.....  
 .....  
 .....  
**(3)**

(iii) Describe the function of the partially permeable membrane.

.....  
 .....  
 .....  
**(2)**

(iv) In a normal kidney, which structure acts as the partially permeable membrane?

.....  
**(1)**

(d) Long term treatment for kidney failure is for the person to have a kidney transplant.

(i) State **three** advantages to a person having a transplant rather than continued dialysis treatment.

1 .....  
 .....  
 2 .....  
 .....  
 3 .....  
 .....  
**(3)**



(ii) One disadvantage of a transplant is the need to find a donor with a matching tissue type. Why is this process important?

.....

.....

.....

(2)

Q5

(Total 18 marks)

6. (a) Complete the sentences using words from the list.

- diffusion**
- synaptic clefts**
- neurotransmitters**
  
- vesicles**
- electrochemical**
- synapse**

Nerve impulses pass along an axon in the form of an .....  
impulse. Nerve cells come very close to the ends of other nerve cells at gaps  
called a ..... . Nerve impulses are able to pass across  
these gaps because of chemical substances. These substances are known  
as ..... , an example of which is acetylcholine. The impulse  
reaches a pre-synaptic membrane, which is separated from the post-synaptic  
membrane, by a small gap called a ..... . The acetylcholine  
is formed at the end of the pre-synaptic axon and is contained  
in ..... . When the acetylcholine is released, it passes from  
the pre-synaptic membrane to the post-synaptic membrane  
by ..... where it stimulates another impulse.

**(6)**

(b) Suggest why the release of acetylcholine requires large numbers of mitochondria to be present in the pre-synaptic axon.

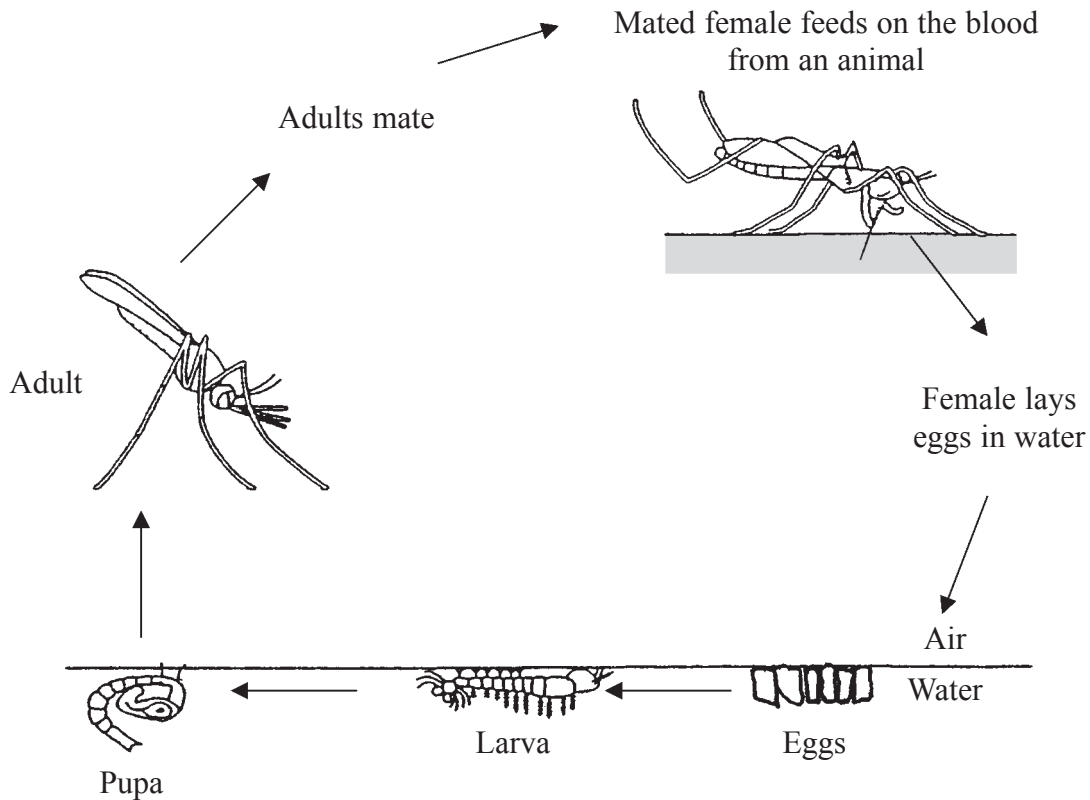
.....  
.....  
.....

**(2)**

**(Total 8 marks)**

**Q6**

7. The diagram below shows an outline of the life cycle of an insect that is the vector of the malarial parasite.



(a) (i) Name the type of insect shown in the diagram.

..... (1)

(ii) What is meant by the term **vector** in this context?

.....  
 .....  
 ..... (2)

(iii) On the diagram, circle the stage at which malaria is passed on to a human.

(1)

(iv) Give **two** stages of the life cycle where control measures could be used to stop the spread of malaria. In each case explain how the control measure would be effective.

Stage 1 .....

Explanation .....

.....

.....

Stage 2 .....

Explanation .....

.....

.....

**(4)**

(b) Suggest **two** reasons why malaria is a difficult disease to control.

1 .....

.....

2 .....

.....

**(2)**

(c) There is evidence that global temperatures are increasing. Suggest **two** possible effects of increases in global temperature on the number of cases of malaria.

.....

.....

.....

.....

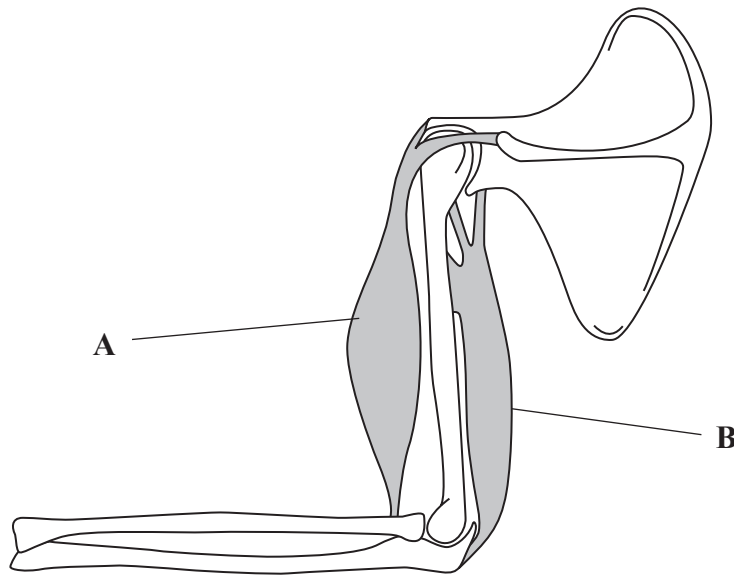
**(2)**

**Q7**

**(Total 12 marks)**

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8. The diagram below shows two muscles which move the human elbow joint.



(a) (i) Name the two muscles **A** and **B**.

**A**.....

**B**.....

(2)

(ii) Name **two** types of synovial joint shown in the diagram.

1 .....

2 .....

(2)

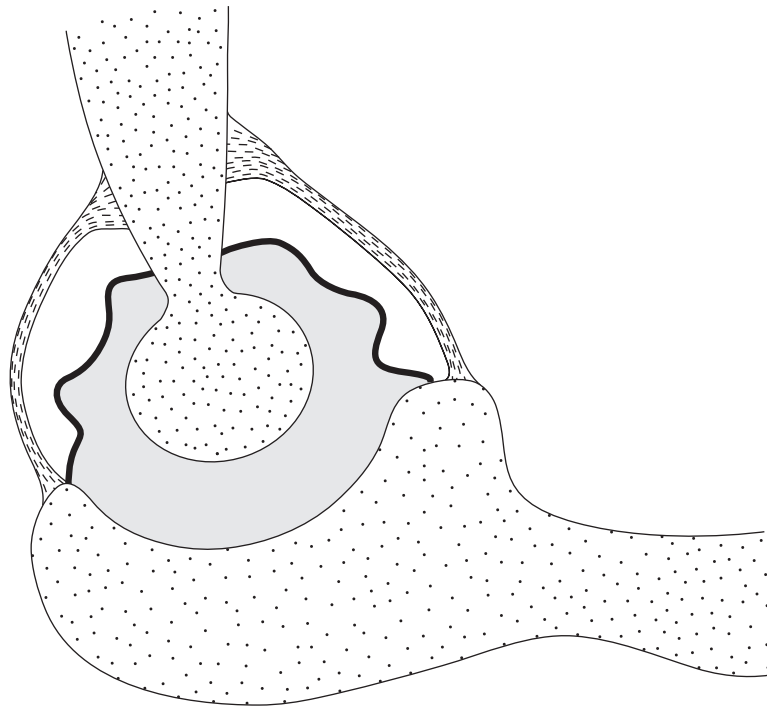
(iii) Explain how the two muscles **A** and **B** cause movement of the forearm.

.....  
.....  
.....  
.....  
.....

(4)

(b) The diagram below shows an elbow without cartilage.

Explain why the person whose elbow is shown is likely to have painful and difficult movement of the joint.



.....

.....

.....

.....

.....

(4)

Q8

(Total 12 marks)

--	--

9. Haemoglobin exists in two forms, normal haemoglobin and sickle-cell haemoglobin.

The allele for normal haemoglobin is Hb and that for sickle-cell haemoglobin is Hb<sup>S</sup>. The alleles are codominant where they exist in the genotype.

(a) (i) State what is meant by the term **genotype**.

.....  
.....  
**(1)**

(ii) State what is meant by the term **codominant**.

.....  
.....  
.....  
.....  
**(2)**

(b) (i) Name the type of cells in which haemoglobin is found.

.....  
**(1)**

(ii) Describe the function of haemoglobin.

.....  
.....  
.....  
.....  
.....  
.....  
**(3)**

- (c) (i) A person with the allele  $Hb^S$  is resistant to malaria. Complete the table below, to show the possible genotypes of the children born to two sets of parents with genotypes given.

For each child state whether this genotype would be resistant to malaria or not. Part of the table has been completed for you.

Genotype of parents		Genotypes of possible children	Resistance to malaria yes/no
Father	Mother		
$HbHb^S$	$HbHb^S$	$HbHb$	no
$HbHb$	$HbHb^S$	$HbHb$	no

(6)

- (ii) Parents who have particular genotypes can produce children who all have resistance to malaria but none of the children suffer from sickle-cell anaemia.

State the genotypes of such parents.

Parent 1 .....

Parent 2 .....

(2)

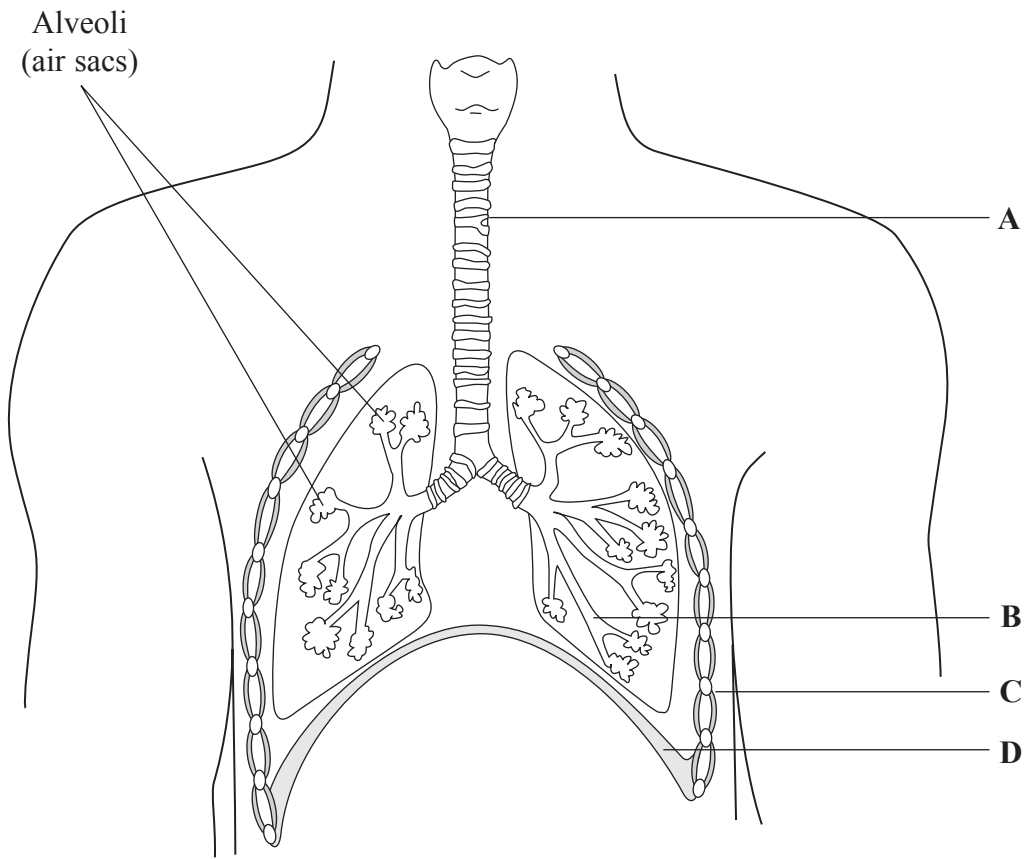
(Total 15 marks)

Q9

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10. The diagram below shows the human respiratory system.



(a) (i) Name the structures **A**, **B**, **C** and **D**.

**A**.....

**B**.....

**C**.....

**D**.....

(4)

(ii) Describe **two** features of the alveoli which help in gaseous exchange.

1 .....

2 .....

(2)

(b) The table below shows the percentage composition of the main gases in inspired (atmospheric) air and expired air.

Gas	Inspired %	Expired %
nitrogen	79	
oxygen	21	
carbon dioxide	0.03	4

(i) Complete the table to show the correct missing figures. (2)

(ii) Describe **two** differences, other than those shown in the table, between inspired and expired air.

1 .....

2 .....

(2)

(c) How does the body prevent bacteria passing into the lungs?

.....

.....

.....

.....

(3)

**Q10**

(Total 13 marks)

**TOTAL FOR PAPER: 120 MARKS**

**END**

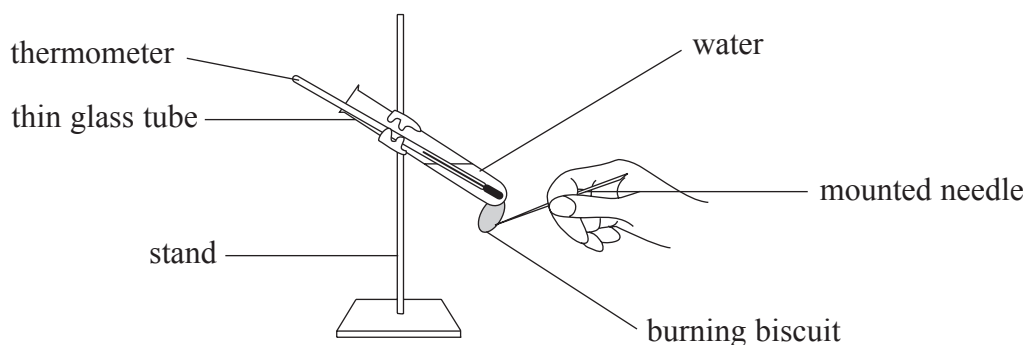
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**Answer ALL questions.**

1. A student used the apparatus shown below to determine the energy value of a small cheese biscuit.



The student held the biscuit on a mounted needle. She placed the biscuit in a Bunsen flame so that it began to burn. She then immediately placed the burning biscuit under the thin glass tube, which contained 8 g of water at 15 °C.

As the biscuit burned, its energy was transferred to the water in the tube. The temperature of this water rose to 95 °C.

It takes 4.2 J of energy to raise the temperature of 1 g of water by 1 °C.

- (a) (i) Calculate the energy, in kilojoules, released when the biscuit was burnt.

= ..... kJ  
**(3)**

- (ii) Give a reason why the change in the temperature of the water may not represent all the energy in the food.

.....  
.....  
**(1)**

- (iii) Why is it necessary to use safety goggles during this investigation?

.....  
.....  
**(1)**

(b) A student decides to use this method to find out which of two foods will have the greatest amount of energy.

Describe two safety precautions the student would have to take if an accurate comparison is to be made.

1 .....

.....

2 .....

.....

**(2)**

(c) High energy foods can contain carbohydrates and fats.

Describe how you would test one of these foods for the presence of a simple sugar.

.....

.....

.....

.....

**(3)**

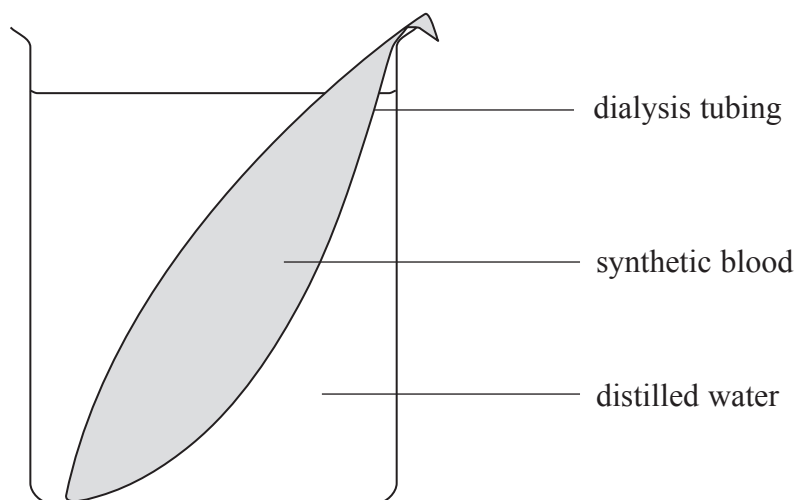
**Q1**

**(Total 10 marks)**

2. Dialysis tubing has the same properties as a cell membrane.

An experiment was set up to study dialysis. A mixture of “synthetic blood” was set up consisting of a solution containing red dye and substances usually found in solution in blood.

The apparatus was set up as in the diagram below.



(a) The distilled water was tested at the start of the experiment and after 30 minutes.

Complete the table below to show the likely results of these tests.

Substance	Present in the distilled water	
	At start of experiment	After 30 minutes
Red dye	Absent	Absent
Glucose	Absent	
Protein	Absent	
Salt	Absent	

(3)



(b) Explain how the dialysis tubing behaves in a way similar to a kidney tubule.

.....  
.....  
.....  
.....

(2)

(c) Which process carried out by a kidney tubule **cannot** be carried out by dialysis tubing?

.....

(1)

**(Total 6 marks)**

Q2

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3. The table below gives details of the incidence of HIV in six major continents.

Each of these gives some indication about social conditions in the same continents.

Continent	Europe	Africa	Asia	South America	North America	Oceania
% of 15 to 49 year olds with HIV infections	0.5	6.1	0.4	0.6	0.6	0.2
Life expectancy of child born in 2005 in years	75	52	65	72	78	73
% of population with access to a safe water supply	100	85	94	95	100	99
Infant mortality per 1000 live births	7	88	57	26	7	29
% of population living on a very low income	0	66	58	24	0	0

(a) (i) In which continent is the incidence of HIV infection lowest?

.....  
(1)

(ii) What is the relationship between the patterns of HIV infection and life expectancy?

Use data from the table to support your answer.

.....  
 .....  
 .....  
 .....  
(2)

(iii) Suggest which continent appears to have the poorest public health conditions.

Use data from the table to support your answer.

.....

.....

.....

.....

(2)

(b) Some people claim that the incidence of HIV infections is related to social conditions. The table below gives information about three countries in one of the continents.

Country	X	Y	Z
<b>% of 15 to 49 year olds with HIV infections</b>	4.4	21.5	24.6
<b>% of population with access to a safe water supply</b>	81	98	100
<b>Infant mortality per 1000 live births</b>	100	43	62
<b>% of population living on a very low income</b>	78	34	83

(i) Does the data in the table justify this claim? Explain your answer.

.....

.....

.....

(2)

(ii) No cure is known for AIDS but people with a higher standard of living may be able to delay the onset of AIDS-related infections.

Suggest one way by which a higher standard of living may delay this onset.

.....  
.....

**(1)**

(iii) HIV is spread between people during sexual intercourse. Give two other ways by which HIV can be spread from one person to another.

1 .....

.....

2 .....

.....

**(2)**

**Q3**

**(Total 10 marks)**

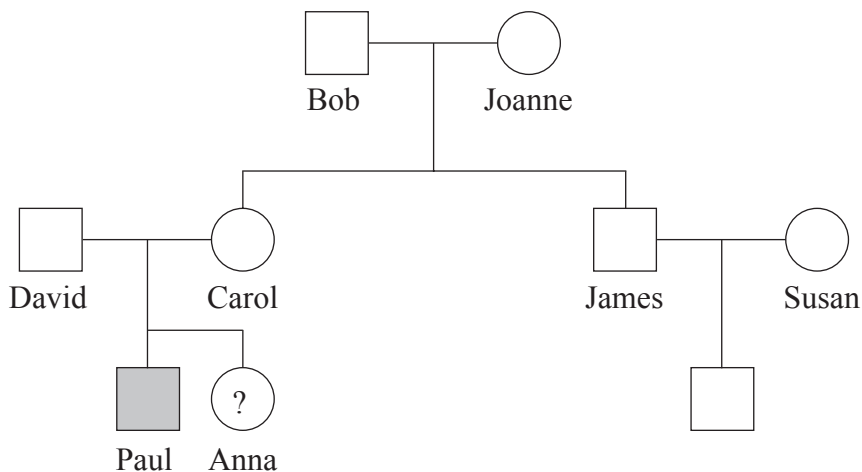
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4. Some people are unable to distinguish between the colours red and green. This is called red-green colour blindness, and is a sex linked condition.





Normal colour vision is produced by a dominant allele (**B**) while red-green colour blindness is produced by a recessive allele (**b**).

The gene for colour vision is carried on the **X** chromosome. The **Y** chromosome carries no colour vision gene.

The diagram shows part of a family tree in which red-green colour blindness occurs.



**Key**

- |  |   |
|--|---|
|  Male with normal colour vision   |  Colour blind male   |
|  Female with normal colour vision |  Colour blind female |

- (a) (i) Paul is colour blind. From which parent has he inherited his colour blindness allele?

..... (1)

- (ii) Explain your answer.

.....  
 .....  
 .....  
 ..... (2)

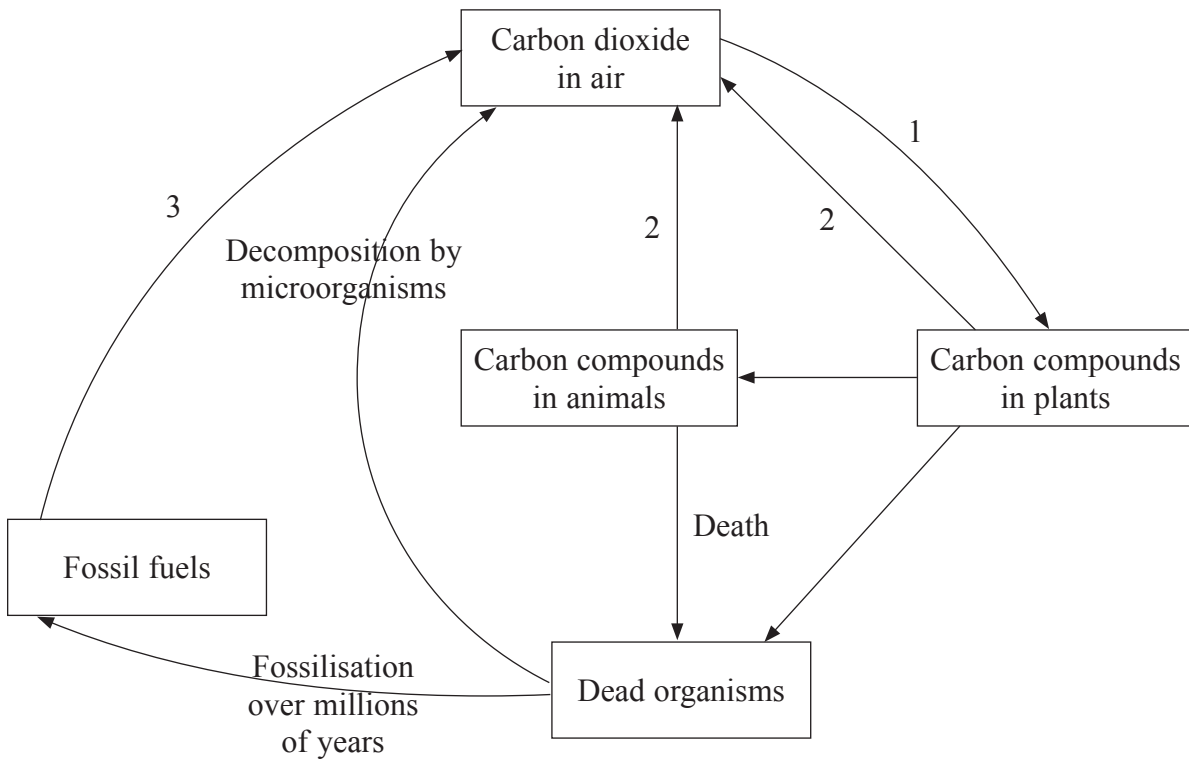
- (b) What are the chances that Paul's baby sister Anna is a carrier for colour blindness? Use the symbols  $X^B$  and  $X^b$  for the colour vision alleles and use a genetic diagram to explain your answer.

(5)

Q4

(Total 8 marks)

5. The diagram below shows the carbon cycle.



(a) (i) Name the processes indicated by the numbered arrows.

- 1 .....
  - 2 .....
  - 3 .....
- (3)**

(ii) Name **one** group of organisms that aids decomposition.

.....

**(1)**



(b) Many people are concerned that the carbon dioxide concentration in the air appears to be increasing.

(i) Use information in the diagram to explain why this may be happening.

.....  
.....  
.....  
.....

(2)

(ii) A rise in carbon dioxide concentration is linked to increased global warming.

Suggest **one** likely harmful effect of global warming on agriculture.

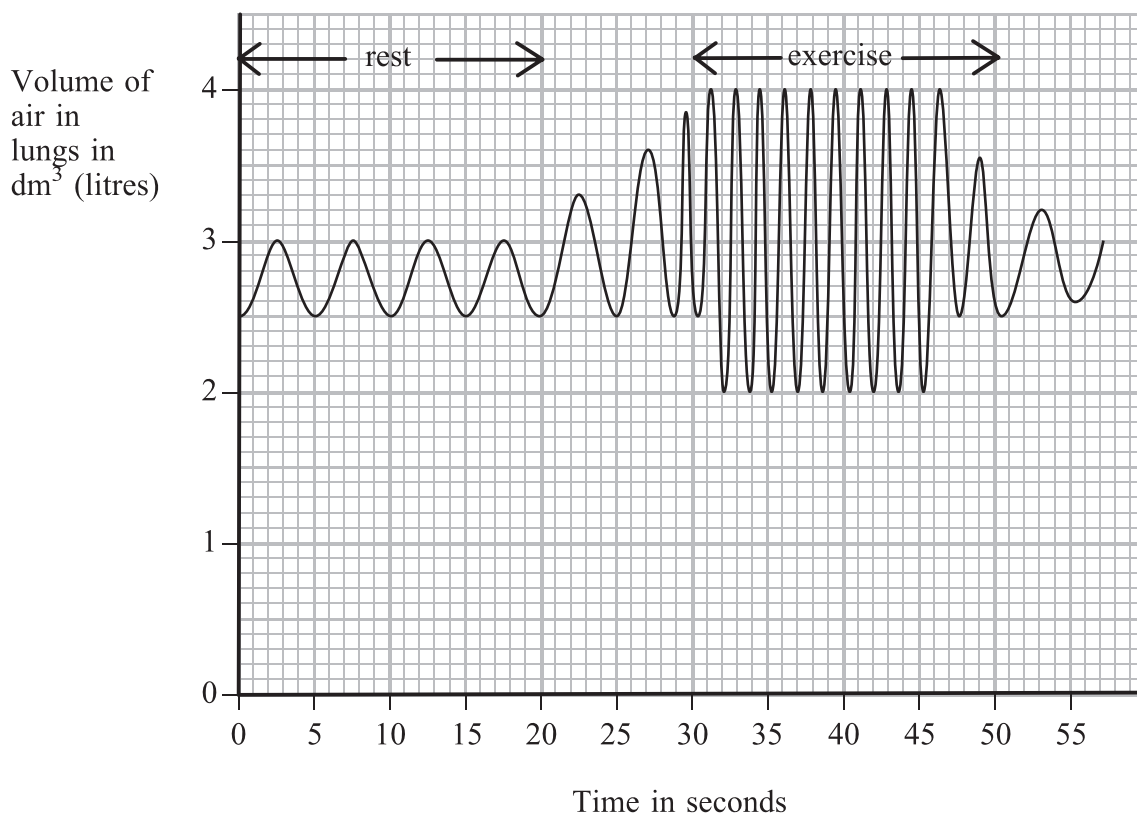
.....  
.....

(1)

(Total 7 marks)

Q5

6. The graph shows how the volume of air in the lungs changed when a person breathed in and out at rest and during exercise.



- (a) (i) How much air remains in the lungs after breathing out at rest?

..... (1)

- (ii) How much air does the person take in during one breath at rest?

..... (1)

- (iii) How many breaths would this person take during one minute at rest?

..... (1)

(iv) What changes occurred in the pattern of breathing during exercise compared with that at rest?

.....  
 .....  
 .....

(2)

(b) The table below shows the composition of air breathed in and air breathed out of the lungs at rest.

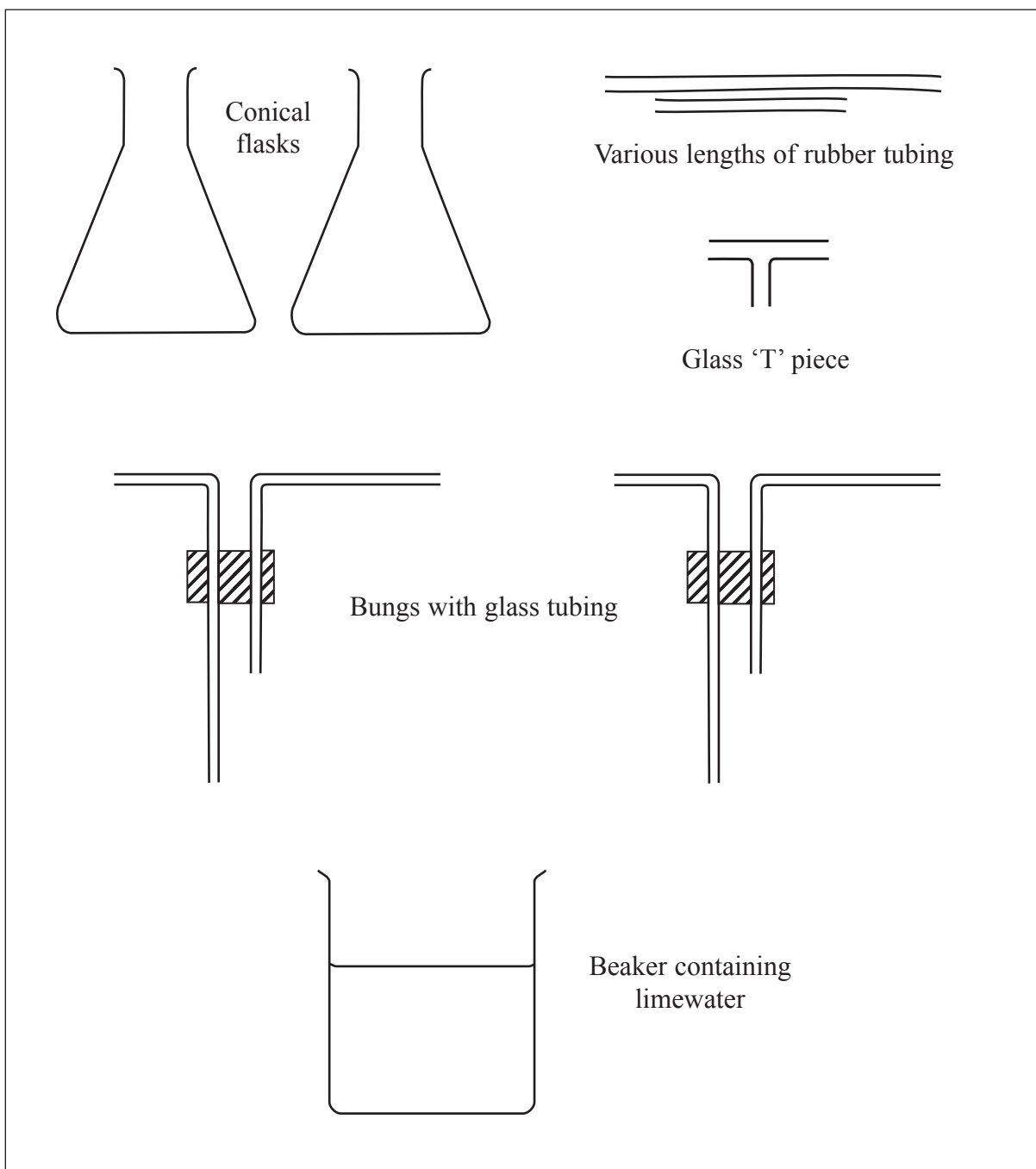
Gas	Percentage composition of air	
	Air breathed in	Air breathed out
Oxygen	21	17
Carbon dioxide	0.03	4
Nitrogen	78	78
Other gases	less than 1	1

Use the table, the graph and your answers to (a) to calculate the amount of oxygen taken into the blood in one minute at rest.

Show your working.

Answer ..... dm<sup>3</sup>  
 (2)

(c) A student is provided with the apparatus shown in the diagram below.



(i) Draw a labelled diagram to show how the student could assemble the apparatus to compare the carbon dioxide content of inspired and expired air. Use all the equipment.

**(3)**

(ii) Describe a safety precaution the student should take to ensure that the comparison in (i) was valid.

.....

.....

**(1)**

**Q6**

**(Total 11 marks)**

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7. Describe the role of negative feedback in the regulation of blood glucose concentration by hormones produced in the pancreas.

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Q7

**(Total 8 marks)**

**TOTAL FOR PAPER: 60 MARKS**

**END**

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## Sample mark schemes

General Marking Guidance	57
Human Biology Paper 1	59
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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.



## Human Biology Paper 1

Question Number	Answer	Mark
<b>1(a)</b>	D	<b>1</b>

Question Number	Answer	Mark
<b>1(b)</b>	C	<b>1</b>

Question Number	Answer	Mark
<b>1(c)</b>	C	<b>1</b>

Question Number	Answer	Mark
<b>1(d)</b>	B	<b>1</b>

Question Number	Answer	Mark
<b>1(e)</b>	B	<b>1</b>

Question Number	Answer	Mark
<b>1(f)</b>	A	<b>1</b>

Question Number	Answer	Mark
<b>1(g)</b>	C	<b>1</b>

Question Number	Answer	Mark
<b>1(h)</b>	A	<b>1</b>

Question Number	Answer	Mark
<b>1(i)</b>	B	<b>1</b>

Question Number	Answer	Mark
<b>1(j)</b>	D	<b>1</b>

Question Number	Answer	Mark
<b>2(a)(i)</b>	0/1 - 6 days	<b>1</b>

Question Number	Answer	Mark
<b>2(a)(ii)</b>	menstruation/shedding of lining	<b>1</b>

Question Number	Answer	Mark
<b>2(a)(iii)</b>	13 - 28 days	<b>1</b>

Question Number	Answer	Mark
<b>2(a)(iv)</b>	<ul style="list-style-type: none"> <li>• secretion of progesterone/hormone thickens uterus lining</li> <li>• preparation for implantation of embryo</li> <li>• to receive fertilised ovum</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>2(b)</b>	0 - 13 days (1 mark) Plus any three from: <ul style="list-style-type: none"> <li>• no ovum present / released yet</li> <li>• lining thin</li> <li>• no fertilisation possible even if sperm present.</li> </ul>	<b>4</b>

Question Number	Answer	Mark
<b>3(a)(i)</b>	3000	<b>1</b>

Question Number	Answer	Mark
<b>3(a)(ii)</b>	8000	<b>1</b>

Question Number	Answer	Mark
<b>3(a)(iii)</b>	20 - 24 years	<b>1</b>

Question Number	Answer	Mark
<b>3(a)(iv)</b>	most sexually active	<b>1</b>

Question Number	Answer	Mark
3(b)(i)	AIDS/HIV gonorrhoea accept other correct answers	1

Question Number	Answer	Mark
3(b)(ii)	<ul style="list-style-type: none"> <li>• use of a condom</li> <li>• one partner</li> <li>• avoid sex</li> </ul>	3

Question Number	Answer	Mark
4(a)(i)	measuring cylinder	1

Question Number	Answer	Mark
4(a)(ii)	line at 3 cm <sup>3</sup>	1

Question Number	Answer	Mark
4(b)(i)	Biuret/Millons	1

Question Number	Answer	Mark
4(b)(ii)	A = (pale) blue/colourless B = mauve/pale purple/red	2

Question Number	Answer	Mark
4(c)(i)	A = 70°C B = 35/36 °C	2

Question Number	Answer	Mark
4(c)(ii)	table with column for times at least 4 times at 2 minute intervals given columns for mixture A and B headings indicating colour of test results	4

Question Number	Answer	Mark
<b>4(c)(iii)</b>	B plus any two from: <ul style="list-style-type: none"> <li>• in A temperature too high</li> <li>• denatures / destroys enzymes</li> <li>• no digestion happens / digestion only happens in B.</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>5(a)</b>	liver lungs cornea pancreas	<b>4</b>

Question Number	Answer	Mark
<b>5(b)(i)</b>	urine	<b>1</b>

Question Number	Answer	Mark
<b>5(b)(ii)</b>	renal artery	<b>1</b>

Question Number	Answer	Mark
<b>5(c)(i)</b>	urea	<b>1</b>



Question Number	Answer	Mark
<b>5(c)(ii)</b>	any three from: <ul style="list-style-type: none"> <li>• if higher would enter blood</li> <li>• cause imbalance in blood composition</li> <li>• osmotic effect</li> <li>• damage cells.</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>5(c)(iii)</b>	any two from: <ul style="list-style-type: none"> <li>• prevents passage of proteins</li> <li>• and red blood cells</li> <li>• allows passage of smaller molecules.</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>5(c)(iv)</b>	bowman's capsule	<b>1</b>

Question Number	Answer	Mark
<b>5(d)(i)</b>	any three from: <ul style="list-style-type: none"> <li>• not attached to machine for long periods</li> <li>• lower risk of infection</li> <li>• fewer dietary restrictions</li> <li>• able to travel away from hospital.</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>5(d)(ii)</b>	any two from: <ul style="list-style-type: none"> <li>• if tissues don't match</li> <li>• rejection occurs</li> <li>• organ/kidney won't function.</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>6(a)</b>	electrochemical synapse neurotransmitters synaptic cleft vesicles diffusion	<b>6</b>

Question Number	Answer	Mark
6(b)	any two from: <ul style="list-style-type: none"> <li>• active process</li> <li>• ATP required</li> <li>• released by aerobic respiration</li> </ul>	2

Question Number	Answer	Mark
7(a)(i)	(anopheline) mosquito	1

Question Number	Answer	Mark
7(a)(ii)	organism that transfers a parasite/pathogen/ from one host to another vector not harmed by parasite/pathogen	2

Question Number	Answer	Mark
7(a)(iii)	line labelled A at point where 'Mated female feeds on the blood from an animal'	1

Question Number	Answer	Mark
7(a)(iv)	1 mark for stage identified + 1 mark for explanation in each case. <ul style="list-style-type: none"> <li>• stage 1 adult/mated female (1 mark) (+ one mark for explanation): spray with insecticide kills adults use mosquito nets prevents access to humans.</li> <li>• stage 2 water stages (1 mark) (+ 1 mark for explanation): drain water remove breeding ground spray oil/insecticide destroys larvae.</li> </ul>	4

Question Number	Answer	Mark
7(b)	any two from: <ul style="list-style-type: none"> <li>• difficult to remove all breeding areas</li> <li>• can lay eggs in small amounts of water</li> <li>• no drugs to destroy Plasmodium</li> <li>• mosquito becoming resistant to insecticides</li> <li>• no vaccinations</li> </ul>	2

Question Number	Answer	Mark
7(c)	Any two from: <ul style="list-style-type: none"> <li>• mosquito requires warm climate</li> <li>• more area of world becoming warmer</li> <li>• mosquito will spread to more areas</li> <li>• taking malaria with it</li> </ul>	2

Question Number	Answer	Mark
8(a)(i)	A: biceps B: triceps	2

Question Number	Answer	Mark
8(a)(ii)	hinge ball and socket	2

Question Number	Answer	Mark
8(a)(iii)	2 marks for A from: <ul style="list-style-type: none"> <li>• A/biceps contracts</li> <li>• forearm moves up</li> <li>• B/triceps stretched.</li> </ul> 2 marks for B from: <ul style="list-style-type: none"> <li>• B/triceps contracts</li> <li>• forearm moves down</li> <li>• ref antagonistic.</li> </ul>	4

Question Number	Answer	Mark
<b>8(b)</b>	1 mark for each of the following maximum 4 marks no cartilage shown which: <ul style="list-style-type: none"> <li>• normally covers ends of bone</li> <li>• is smooth</li> <li>• reduces friction</li> <li>• is a shock absorber</li> <li>• means bones will rub together</li> <li>• will cause difficulty in movement/pain.</li> </ul>	<b>4</b>

Question Number	Answer	Mark
<b>9(a)(i)</b>	genes/alleles found on chromosomes/genetic make-up	<b>1</b>

Question Number	Answer	Mark
<b>9(a)(ii)</b>	any 2 from: <ul style="list-style-type: none"> <li>• two alleles</li> <li>• equal dominance/neither is recessive or dominant</li> <li>• both expressed in phenotype.</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>9(b)(i)</b>	red blood cells	<b>1</b>

Question Number	Answer	Mark
<b>9(b)(ii)</b>	any three from: <ul style="list-style-type: none"> <li>• combines with oxygen</li> <li>• to form oxyhaemoglobin</li> <li>• transports oxygen from lungs</li> <li>• to respiring cells/tissues.</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>9(c)(i)</b>	Hb <sup>S</sup> Hb <sup>S</sup> yes Hb <sup>S</sup> Hb/Hb Hb <sup>S</sup> yes Hb Hb <sup>S</sup> yes	<b>6</b>

Question Number	Answer	Mark
9(c)(ii)	HbHb Hb <sup>S</sup> Hb <sup>S</sup>	2

Question Number	Answer	Mark
10(a)(i)	A: trachea B: bronchioles C: ribs D: diaphragm	4

Question Number	Answer	Mark
10(a)(ii)	any two from: <ul style="list-style-type: none"> <li>• large surface area</li> <li>• good blood supply</li> <li>• thin epithelium.</li> </ul>	2

Question Number	Answer			Mark
10(b)(i)	Gas	Inspired %	Expired %	2
	nitrogen	79	79 (1)	
	oxygen	21	16/17 (1)	
	carbon dioxide	0.03	4	

Question Number	Answer	Mark
10(b)(ii)	Any two correct answers, eg <ul style="list-style-type: none"> <li>• expired air is warmer</li> <li>• expired air is moister</li> </ul>	2

Question Number	Answer	Mark
10(c)	any three from: <ul style="list-style-type: none"><li>• mucus layer secreted (by lining of trachea)</li><li>• mucus traps bacteria</li><li>• cilia present on lining cells</li><li>• cilia beat to push mucus up/towards throat/away from lungs/out of body.</li></ul>	3

## Human Biology Paper 2

Question Number	Answer	Mark
1(a)(i)	80 x 8 x 4.2 2688J / 2.69(kJ)	3

Question Number	Answer	Mark
1(a)(ii)	any one of the following: <ul style="list-style-type: none"> <li>• some energy lost in heating air / glass</li> <li>• some energy lost as light</li> <li>• not all of food fully burnt / energy released.</li> </ul>	1

Question Number	Answer	Mark
1(a)(iii)	hot water may spit out of tube / food may give off sparks	1

Question Number	Answer	Mark
1(b)	any two - 1 mark each: <ul style="list-style-type: none"> <li>• use same mass of food / use known mass</li> <li>• use same volume of water / use known amount</li> <li>• burning food held same distance from bottom of tube.</li> </ul>	2

Question Number	Answer	Mark
1(c)	any three - 1 mark each: <ul style="list-style-type: none"> <li>• break up food in water</li> <li>• add Benedict's solution</li> <li>• heat gently</li> <li>• look for green/yellow/orange/red colour to occur.</li> </ul>	3

Question Number	Answer	Mark
<b>2(a)</b>	glucose - present protein - absent salt - present	<b>3</b>

Question Number	Answer	Mark
<b>2(b)</b>	tubing is selectively / partially / semi permeable (1) allows small molecules to pass through but not large ones (1)	<b>2</b>

Question Number	Answer	Mark
<b>2(c)</b>	selective reabsorption / OWTTE	<b>1</b>

Question Number	Answer	Mark
<b>3(a)(i)</b>	Oceania	<b>1</b>

Question Number	Answer	Mark
<b>3(a)(ii)</b>	high HIV infection ( Africa 6.1%) lower life expectancy (1) low HIV infection (Oceania 0.2%) higher life expectancy (1) accept any suitable examples for explanation	<b>2</b>

Question Number	Answer	Mark
<b>3(a)(iii)</b>	Africa (1) ref to any two of the following: <ul style="list-style-type: none"> <li>• life expectancy</li> <li>• safe water supply</li> <li>• infant mortality</li> <li>• poverty</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>3(b)(i)</b>	no (no mark) X has highest infant mortality, low income, lowest safe water supply (1) but has low HIV incidence (1)	<b>2</b>





Question Number	Answer	Mark
<b>5(a)(i)</b>	1 - photosynthesis 2 - respiration 3 - combustion	<b>3</b>

Question Number	Answer	Mark
<b>5(a)(ii)</b>	bacteria/fungi/saprophytes	<b>1</b>

Question Number	Answer	Mark
<b>5(b)(i)</b>	any two - 1 mark each: <ul style="list-style-type: none"> <li>• increased energy demand</li> <li>• leads to greater combustion (of fossil fuels)</li> <li>• carbon dioxide locked up for millions of years (in fossil fuels) now released over short period.</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>5(b)(ii)</b>	possible climate change / ice caps melting / rise in sea levels / other valid example	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(i)</b>	2.5 dm <sup>3</sup>	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(ii)</b>	0.5 dm <sup>3</sup>	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(iii)</b>	12	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(iv)</b>	breathe more rapidly breathe more deeply	<b>2</b>

Question Number	Answer	Mark
<b>6(b)</b>	method correct / $12 \times 0.5 \text{ dm}^3 \times 4$ $240\text{cm}^3 / 0.24 (\text{dm}^3)$	<b>2</b>

Question Number	Answer	Mark
<b>6(c)(i)</b>	apparatus in correct sequence/T piece connected to both flasks long tube from each bung in limewater short tubes above level of limewater	<b>3</b>

Question Number	Answer	Mark
<b>6(c)(ii)</b>	same amount of air inhaled and exhaled/same volume of limewater in each flask	<b>1</b>

Question Number	Answer
7	<p><u>Negative feedback:</u></p> <p>an increase or decrease in a factor is detected this triggers a response that returns the factor to normal</p> <p><u>Increasing blood glucose concentration:</u></p> <p>concentration rises detected by cells in Islets of Langerhans / pancreas (beta) cells secrete insulin insulin stimulates liver to store glucose as glycogen blood glucose concentration falls</p> <p><u>Decreasing blood glucose concentration:</u></p> <p>concentration falls (below normal) after exercise / respiration detected by cells in Islets of Langerhans / pancreas (alpha) cells secrete glucagon liver releases glucose from glycogen blood glucose concentration rises</p>

Level	Descriptor	Mark
Level 0	No rewardable response.	0
Level 1	Only one area covered, correct facts very limited, poor spelling and use of scientific terms.	1-2
Level 2	Only two areas attempted, factual errors occur, some scientific terms used correctly.	3-4
Level 3	Two areas covered, most facts correct, correct use of scientific terminology.	5-6
Level 4	All three areas covered, most facts correct, correct use of scientific terminology, continuous prose must be used.	7-8



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