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IGCSE

Biology

Sample Assessment Materials (SAMs)

Edexcel IGCSE in Biology (4BI0)

First examination 2011

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Acknowledgements

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Prepared by Phil Myers

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Contents

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

Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	B	I	0	/	1	B	Signature	

Paper Reference(s)

4BI0/1B

Edexcel IGCSE

Biology

Biology Paper 1

Sample Assessment Material

Time: 2 hours

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
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14	
15	
16	
17	
18	
Total	

Materials required for examination
Ruler

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials 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.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 18 questions in this question paper. The total mark for this paper is 120.
There are 24 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

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Turn over

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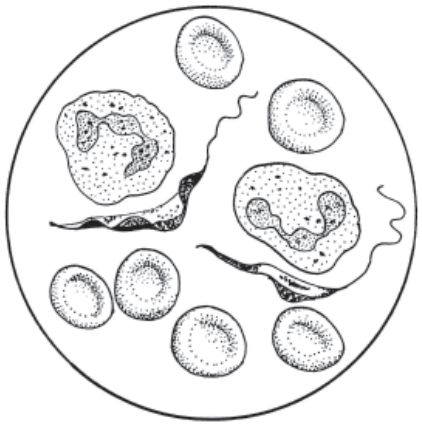
Answer ALL questions.

1. The diagram shows a sample of blood seen using a microscope. The blood was from a person suffering from a disease caused by a microorganism.



(a) State the number of blood cells in the diagram.

.....

(1)

(b) The microorganism feeds on substances in blood plasma.

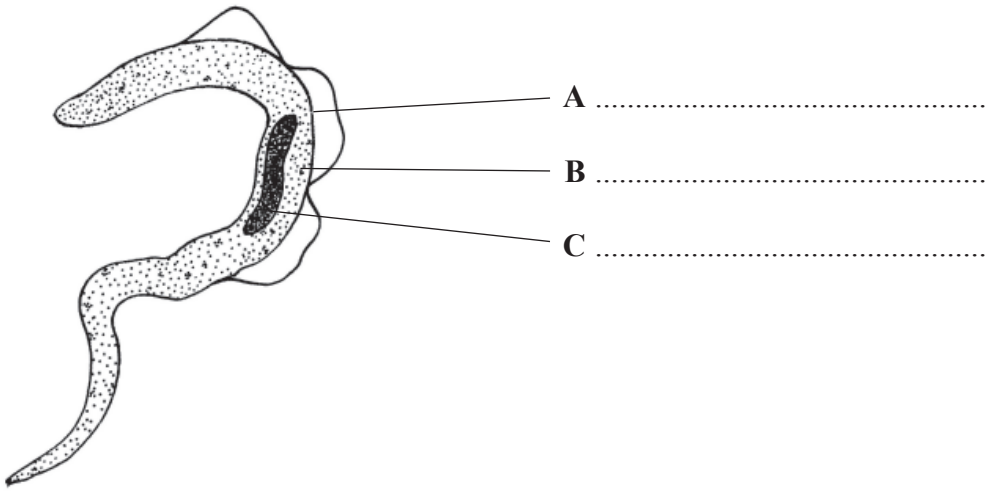
Suggest **two** substances, in blood plasma, that the microorganism would use as food.

1 .....

2 .....

(2)

(c) The diagram shows the microorganism. Name parts **A**, **B** and **C** of this cell on the lines provided.



(3) **Q1**

(Total 6 marks)

Leave blank

2. (a) The table lists types of cell found in the human body.

Complete the table by writing the number of chromosomes found in each cell.

The first one has been done for you.

Name of cell	Number of chromosomes in cell
neurone	46
sperm cell	
red blood cell	
skin cell	

(3)

(b) Sperm cells are needed for fertilisation.

(i) Name the part of the body where sperm cells are made.

.....

(1)

(ii) Name the other type of cell involved in fertilisation.

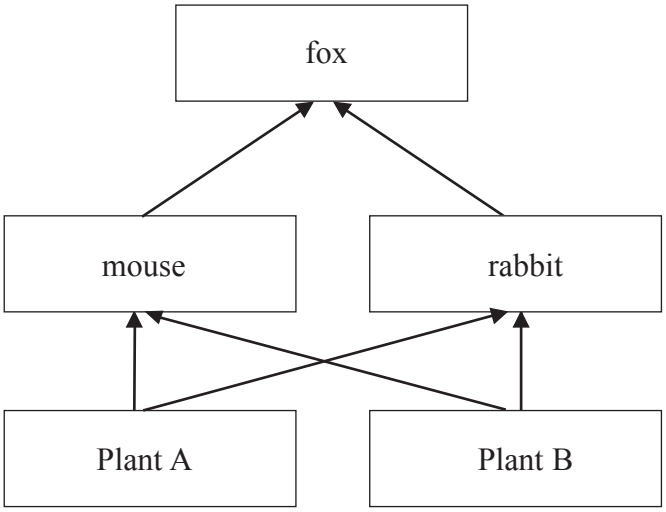
.....

(1) **Q2**

(Total 5 marks)

Leave blank

3. The diagram shows a food web.



(a) Use the information in the food web to complete the table below with a number.

The first has been done for you.

Sentence	Number
The number of organisms is	5
The number of producers is	
The number of animals is	
The number of food chains is	

(3)

(b) A disease caused by a virus killed the rabbits in this food web. Use this information to complete the sentences below.

(i) The number of foxes is likely to .....

(1)

(ii) The number of mice is likely to .....

(1)

Q3

(Total 5 marks)

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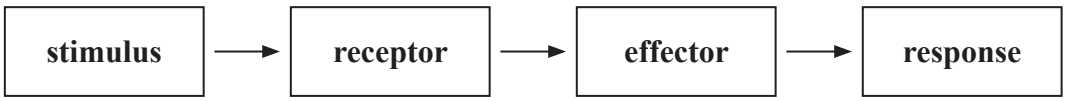
Leave blank

4. Animals are able to respond to changes in their environment.

(a) A coordinated response requires a stimulus, a receptor and an effector. This is shown below in a flow chart.



The brain can act as the coordinator.

(i) On the flow chart above, draw an **X** on one of the arrows to show where the brain would be involved.

(1)

(ii) The brain is part of the central nervous system. Name the other structure which is also part of the central nervous system.

.....

(1)

(b) The eye is a sense organ that contains receptors.

(i) Name the stimulus that enters the eye and is detected by the receptors.

.....

(1)

(ii) Name the part of the eye that contains receptors.

.....

(1)

(iii) Describe how messages travel from receptors in the eye to the brain.

.....

.....

.....

(2)

(c) Give the name of another sense organ, and the stimulus it detects.

Sense organ .....

Stimulus .....

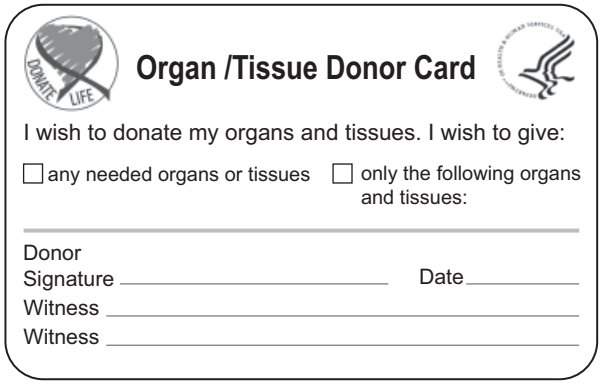
(2)

Q4

(Total 8 marks)

Leave blank

5. Some people carry donor cards like the one shown.



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

The table gives the function of body parts that are commonly donated. Complete the table by naming the donated body part. Choose words from the list to complete the table.

The first answer has been done for you.

cornea **heart** **kidney**

lung **pancreas** **skin**

Function	Donated body part
breaks down toxic chemicals	liver
produces urine	
pumps blood around the body	
fills with air during breathing	
bends light as it enters the eye	
secretes insulin	

Q5

(Total 5 marks)

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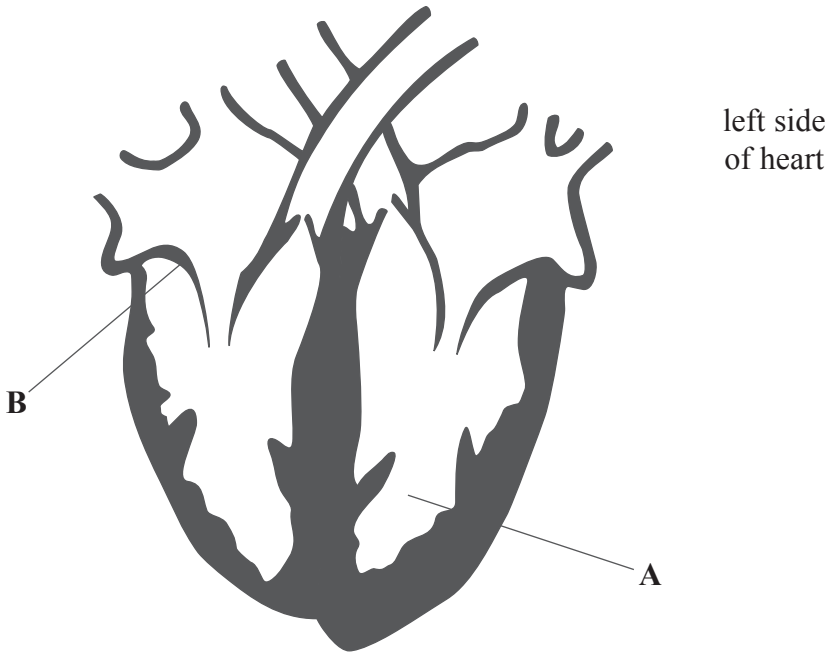
Leave blank

6. The diagram shows a section through a human heart.



(a) Name the parts labelled **A** and **B**.

A .....

B .....

(2)

(b) On the diagram, draw arrows to indicate the direction of blood flow into, through and out of the right side of the heart.

(2)

(c) State the **function** of the part labelled **B**.

.....

.....

.....

.....

(1)

(d) State **one** way in which the blood in the left side of the heart differs from the blood in the right side of the heart.

.....

.....

(1)

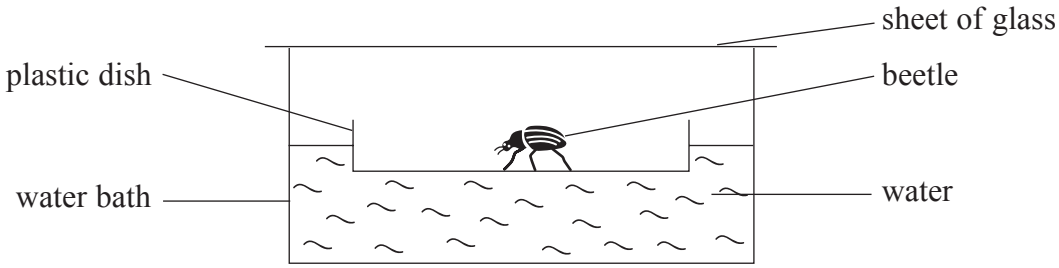
Q6

(Total 6 marks)

Leave blank

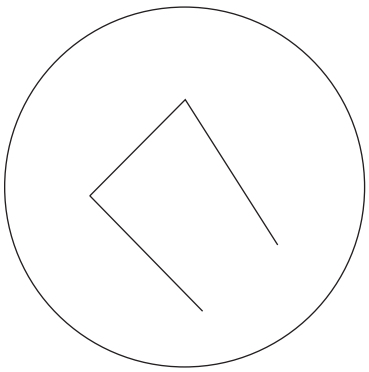
7. A student carried out an investigation to find out how temperature affects movement in beetles. The student placed the beetle in a plastic dish, which was allowed to float on water in a water bath. The water bath could be set at different temperatures from 15 °C upwards.

The apparatus the student used is shown in the diagram below.

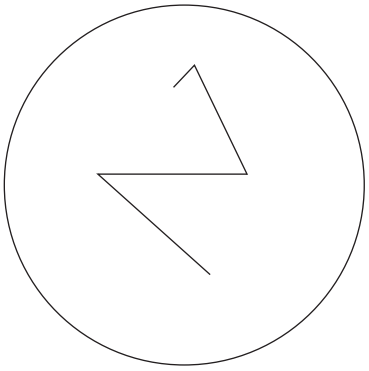


The student wanted to measure the distance moved by the beetle in cm per minute. To do this, the student looked down from the top and recorded the movement of the beetle on the sheet of glass using a pen. The student did this four times (trials) at each temperature using the same beetle.

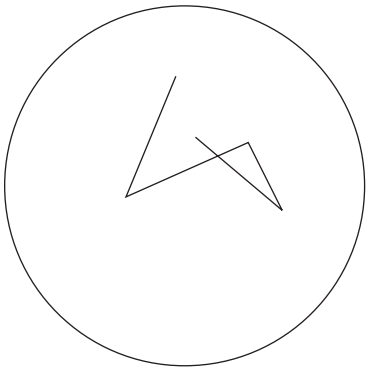
The diagrams show the pen recordings for the beetle's movement during one minute at 25 °C.



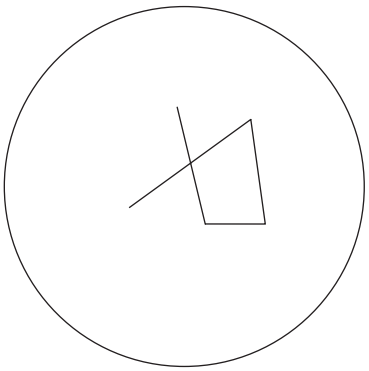
Trial 1



Trial 2



Trial 3



Trial 4

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(a) Table 1 shows the results obtained at 15 °C, 20 °C, 30 °C and 35 °C.

Measure the distance moved in cm by the beetle during each trial at 25 °C. Write your answers in the empty boxes in Table 1.

Table 1

Temperature in °C	Distance moved in cm per minute			
	Trial 1	**Trial 2**	**Trial 3**	**Trial 4**
15	2.4	2.1	1.8	1.7
20	4.3	4.1	4.4	4.0
25				
30	7.0	6.7	6.9	6.6
35	8.3	8.4	8.1	8.0

(4)

(b) Calculate the average distance moved in cm by the beetle at 35 °C. Show your working.

Answer ..... cm

(2)

(c) (i) Suggest how you could adapt the apparatus to obtain results at a temperature of 5 °C.

.....

.....

(1)

(ii) Suggest **one** reason why the student should not collect results above 35 °C.

.....

.....

(1)

Q7

(Total 8 marks)

Leave blank

8. Different types of cells may contain different structures.

Complete the table to show the structures contained in the different cells. If the cell contains the structure put a tick (✓) in the box. If the cell does not contain the structure put a cross (✗).

Some have been done for you.

Cell	Structure			
	Nucleus	**Cytoplasm**	**Cell wall**	**Chloroplast**
neurone (an animal cell)		✓		
Pneumococcus (a bacterial cell)			✓	✗
yeast (a fungal cell)	✓			

Q8

(Total 3 marks)

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Leave blank

9. Describe and explain the consequences of smoking on human lungs.

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Q9

(Total 5 marks)

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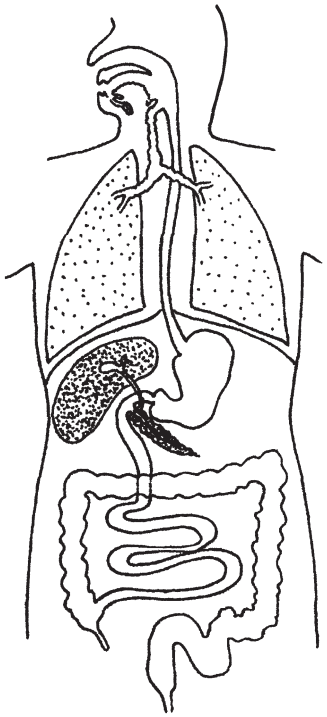
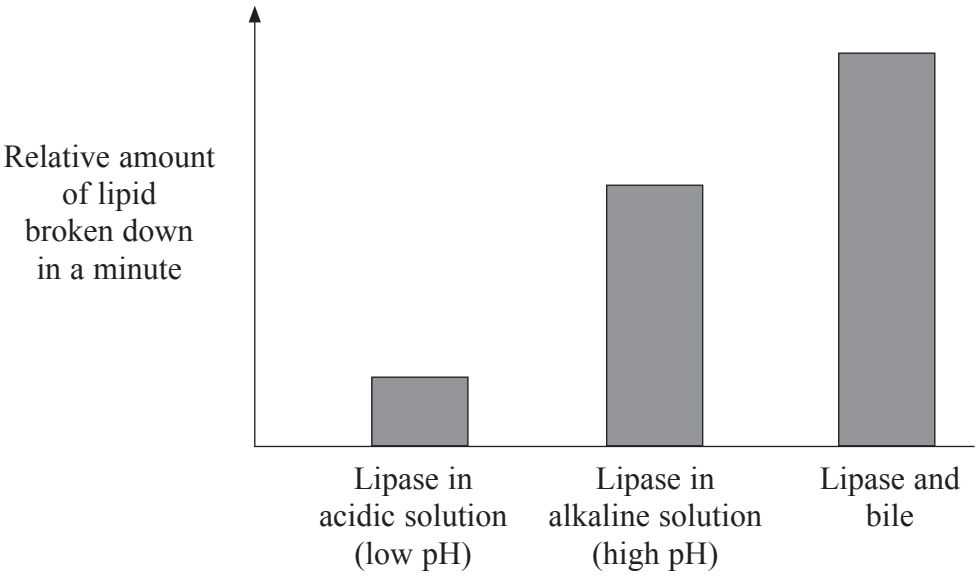
10. Lipase is an enzyme that breaks down lipids (fats) to fatty acids and glycerol. Lipase is produced in the pancreas and in the small intestine.

(a) On the diagram, label the pancreas and the small intestine.



(2)

(b) The graph shows the relative amount of lipid broken down by lipase under different conditions.



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Describe and explain the results shown by the graph.

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.....

.....

(4)

(c) Two other digestive enzymes are amylase and maltase. Complete the table to show the food molecule and the product of digestion for these enzymes.

Enzyme	Food molecule	Product of digestion
amylase		maltose
maltase	maltose	

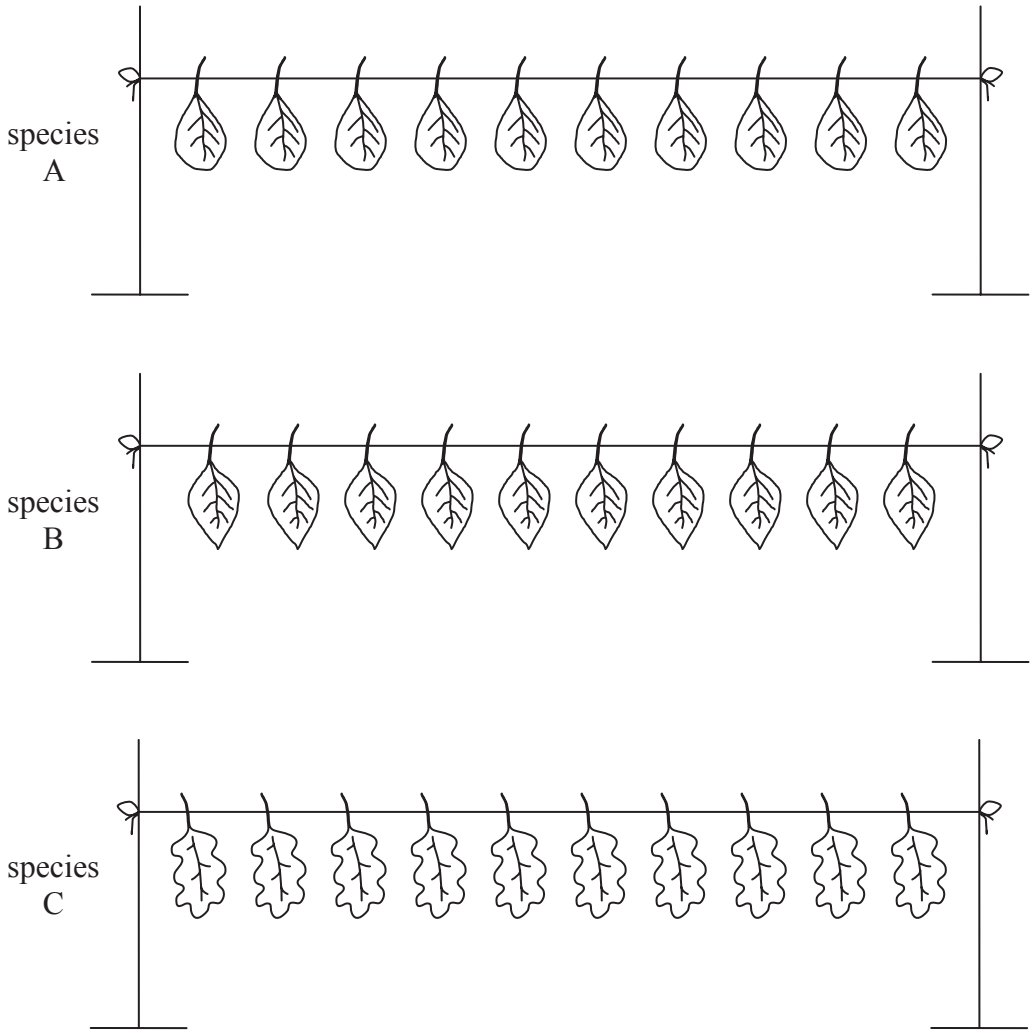
(2) **Q10**

(Total 8 marks)

Leave blank

11. Plants lose water from the surface of their leaves.

A student did an experiment to compare the loss of water from leaves of three different species of plant A, B and C. He weighed 10 leaves of similar size of each species and hung them on a wire for three hours. Then he weighed the leaves again.



(a) Name the process in which water is lost from the surface of a leaf.

.....

(1)

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Leave blank

(b) The table shows the student's results.

Species	Mass of 10 leaves in g	
	At start	After three hours
A	2.25	2.23
B	2.37	2.36
C	2.51	2.51

State which species appeared to lose most water. Give a reason for your answer.

.....

.....

.....

(2)

(c) Suggest **two** reasons why leaves of different plants lose water at different rates.

1 .....

2 .....

(2) **Q11**

(Total 5 marks)

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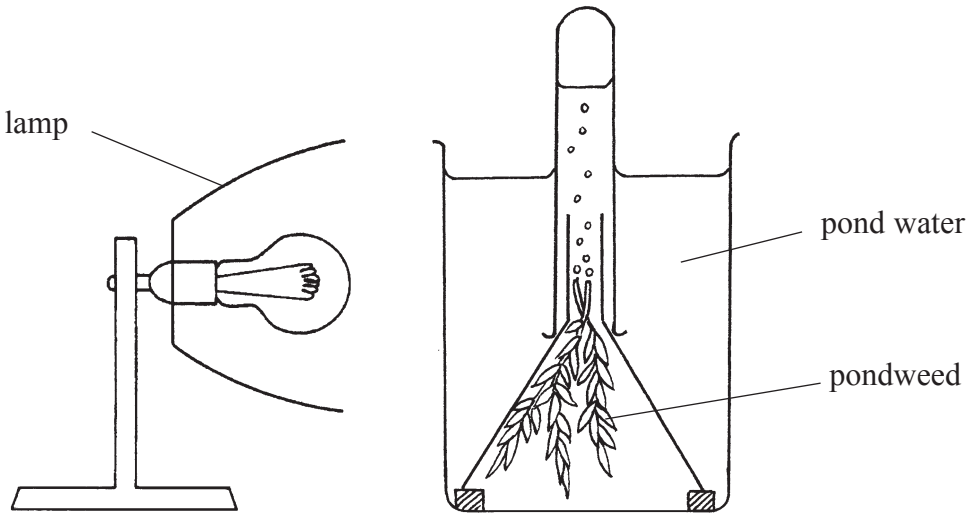
12. Lee wanted to investigate the effect of different light intensities on photosynthesis.

He set up the apparatus shown in the diagram.



(a) Name the gas that the pondweed gives off during photosynthesis.

.....

(1)

(b) Using this apparatus, suggest how Lee could change the light intensity.

.....

.....

(1)

(c) Describe how the apparatus could be used to measure how quickly photosynthesis was occurring.

.....

.....

.....

(2)

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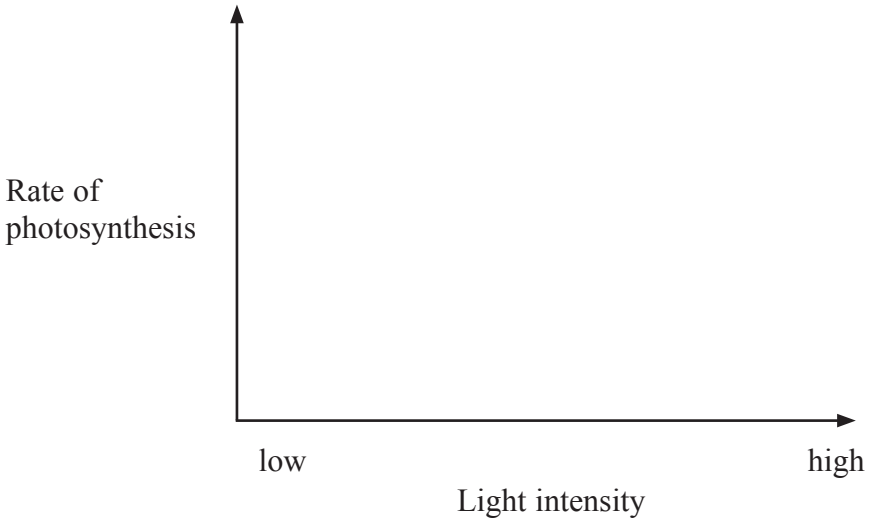
Leave blank

(d) Lee carried out the experiment at a range of light intensities, from low to very high light intensities.

Sketch a line to show what results you would expect.



(2)

(e) State **two** factors other than light intensity that can affect the rate of photosynthesis.

1 .....

2 .....

(2)

Q12

(Total 8 marks)

Leave blank

13. Bread is made from dough. The dough contains yeast, sugar, flour and water. As the yeast respires, it releases a gas that helps the dough to rise.

An experiment was carried out to investigate the effect of temperature and of vitamin C on the rising of dough.

(a) 50 cm^3 of the dough with no vitamin C was put into different measuring cylinders at six different temperatures. There were three measuring cylinders at each temperature.

In a similar way, measuring cylinders were set up using dough with vitamin C. All the measuring cylinders were left for one hour. The table shows the volumes of dough after one hour in each measuring cylinder.

Temperature in °C	**Volume of dough in cm^3 after one hour**	
	With no vitamin C	**With vitamin C**
15	50 50 50	50 50 50
25	55 54 56	58 57 51
35	63 64 65	69 71 70
45	80 82 80	86 87 85
55	65 66 66	67 68 69
65	53 52 52	52 53 52

(i) State the number of measuring cylinders used in this experiment.

.....

(1)

(ii) Identify **one** anomalous (unexpected) result in the table and suggest a reason for this result.

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(2)

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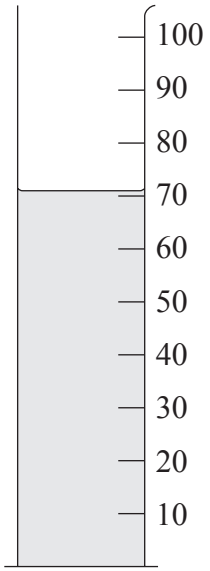
(iii) The diagram shows one of the measuring cylinders from the experiment.



Use the diagram and the information in the table to complete the following sentence.

This measuring cylinder was kept at ..... °C and contained dough

..... vitamin C.

(2)

(b) (i) The yeast cells contain enzymes used in respiration. Use this information to explain the effect of temperature on the rising of dough with no vitamin C.

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.....

.....

.....

(3)

(ii) Describe the effect of adding vitamin C on the rising of the dough.

.....

.....

.....

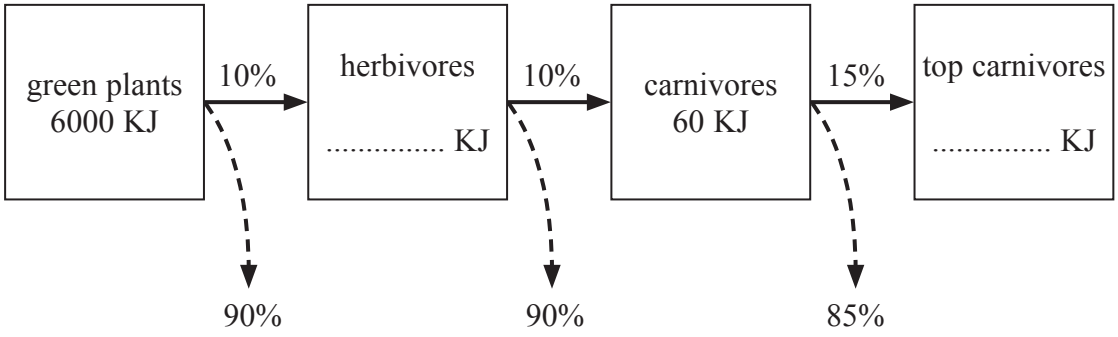
(2)

Q13

(Total 10 marks)

Leave blank

14. The boxes in the diagram show the amount of energy in different trophic levels of a food chain. The numbers on the solid arrows show the percentage of energy transferred between the organisms in the different trophic levels. The numbers on the dotted arrows show the percentage of energy not transferred from one trophic level to the next.



(a) Complete the diagram by showing the amount of energy in the box for the herbivores and in the box for the top carnivores.

(2)

(b) All organisms respire. One reason why 90% of the energy is not transferred from the herbivores to the carnivores is because of respiration by the herbivores.

(i) Give the balanced chemical symbol equation for respiration.

.....

(3)

(ii) Suggest **two** reasons, other than respiration, why 90% of the energy in herbivores is not transferred to the carnivores.

1 .....

.....

2 .....

.....

(2)

(c) Name the group of organisms in this food chain which are secondary consumers.

.....

(1)

Q14

(Total 8 marks)

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Leave blank

15. The passage below describes stages involved in the process of micropropagation in plants.

Use suitable words to complete the sentences in the passage.

Very small pieces are cut from the tips of stems or side shoots of a plant.

When these pieces have been removed they are called

..... . They are cut to a size

of about 0.5 to 1 mm. They are then placed

in ..... medium

containing ..... and

....., which help the pieces to

grow into small plants. When the small plants have grown roots they are

transferred to a glasshouse. They are grown in pots containing

....., and

conditions such as ..... and

..... can be controlled. The small

plants produced are called .....,

which means they are genetically ..... .

Q15

(Total 9 marks)

Leave blank

16. DNA is a double helix with each strand linked by a series of paired bases. There are four bases in DNA.

The table below shows the percentage of each base found in a sample of DNA taken from a mammal. Only two of the bases have been named in the table.

(a) Complete the table to give the names of the other two bases.

Percentage of base in DNA sample	Name of base
30	thymine (T)
20	guanine (G)
30	
20	

(2)

(b) The sample of DNA contained 2000 bases. State the number of thymine bases in the sample of DNA.

.....

(1)

(c) Human DNA contains the gene to make insulin. Bacteria can be modified to contain this gene. Describe the steps used to do this.

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(5) **Q16**

(Total 8 marks)

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17. Huntington's disease is a genetic condition that affects the nervous system. Huntington's disease is caused by a dominant allele, **H**. The condition does not develop until middle age (around 40 years old).

(a) A couple plan to have children. The father is heterozygous for Huntington's disease and the mother is homozygous recessive.

(i) Draw a genetic diagram to show the genotypes of the parents, the gametes and the possible genotypes and phenotypes of their children. Use **H** to represent the allele for Huntington's disease and **h** to represent the normal allele.

(4)

(ii) State the probability of this couple producing a child who will not develop the disease.

.....

(1)

(b) The symptoms of the disease do not appear until middle age. Suggest why this makes it unlikely that Huntington's disease will disappear from the population.

.....

.....

.....

(2) **Q17**

(Total 7 marks)

Leave blank

18. Design an experiment you could carry out to find out how temperature affects the rate of decomposition of plant leaves.

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Q18

(Total 6 marks)

TOTAL FOR PAPER: 120 MARKS

END

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Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	B	I	0	/	2	B	Signature	

Paper Reference(s)

4BI0/2B

Edexcel IGCSE

Biology

Biology Paper 2

Sample Assessment Material

Time: 1 hour

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
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6	
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, initials 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.
Show all the steps in any calculations and state the units.
Calculators may be used.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 6 questions in this question paper. The total mark for this paper is 60.
There are 12 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and in good English.

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Answer ALL the questions. Write your answers in the spaces provided.

1. Read the passage below. Use the information in the passage and your own knowledge to answer the questions that follow.

Lactation

Mammary glands are like sweat glands. In some mammals, such as the platypus, the milk simply oozes from the skin in the same way as sweat. Other mammals have teats, and these help deliver the milk directly into the mouths of the young. However, having teats limits the number of young that a female can suckle, and so most female mammals have twice as many teats as their average litter.

Milk is a liquid made up of water, proteins, fats, carbohydrates and minerals. The milk of different species has a different balance of each of these components, suited to the needs of their young. Milk that is high in protein helps the young to grow fast while milk that is high in fat helps them gain weight quickly and form a layer of fat under the skin (blubber). Mammals that live in cold environments tend to produce milk that is rich in fat. For example, seals and sea lions produce milk that is over 50 per cent fat, and hooded seal pups grow at the rate of about 5 kg per day.

Kangaroos often suckle two young of different ages at the same time, one very young and one older. They produce milk of two different compositions from the teats used by their young. The very young kangaroo is firmly attached to one teat constantly for the first few weeks and is provided with milk with little fat in it. The older kangaroo receives milk with almost 20 per cent fat from another teat.

Milk also contains antibodies, which are passed on from the mother to her offspring, providing them with immunity from many diseases.

Producing milk for her young puts a lot of strain on a mother's resources. She has to produce an ideal, balanced diet for the growing young from her own diet. In hard times mothers may have to produce the milk by metabolising their own body tissues. If a drought or period of starvation continues too long, the mother will eventually stop producing milk and the young may die.

(a) Suggest why most female mammals have twice as many teats as their average litter. (line 4)

.....

.....

(1)

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Leave blank

(b) Suggest why mammals that live in cold climates produce milk rich in fat. (lines 10 and 11)

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(2)

(c) Suggest why kangaroos produce milk of two different compositions for their two young. (line 14)

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(2)

(d) Female mammals produce milk due to the action of a hormone called prolactin. Name another female reproductive hormone and give **one** function that it has.

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(2)

(e) Explain why it may be an advantage to a mother to stop producing milk during a period of starvation. (lines 23 and 24)

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(2)

Leave blank

(f) Many human mothers feed their young with breast milk rather than commercially produced powdered milk. Give **three** reasons why a mother may choose breast milk rather than powdered milk.

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.....

(3) **Q1**

(Total 12 marks)

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Leave blank

2. Hoagland was a scientist who measured the concentration of mineral ions in the cell sap (cytoplasm) of a freshwater plant. He also measured the concentration of several ions found in the pond water in which the plant lived. His results are shown in the table below.

Location	**Concentration of ions in mg per litre**				
	Sodium	Potassium	Magnesium	Calcium	Chloride
Cell sap	1980	2400	260	380	3750
Pond water	28	2	360	26	35

(a) Which mineral ion has the greatest difference in concentration between the cell sap and the pond water?

.....

(1)

(b) Name **one** ion that could have entered the plant by diffusion. Explain your answer.

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(3)

(c) Suggest the function of the magnesium ions in the plant.

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(1)

(d) Hoagland found that some ions were absorbed only if oxygen was bubbled through the pond water. Explain this observation.

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(3)

(Total 8 marks)

Q2

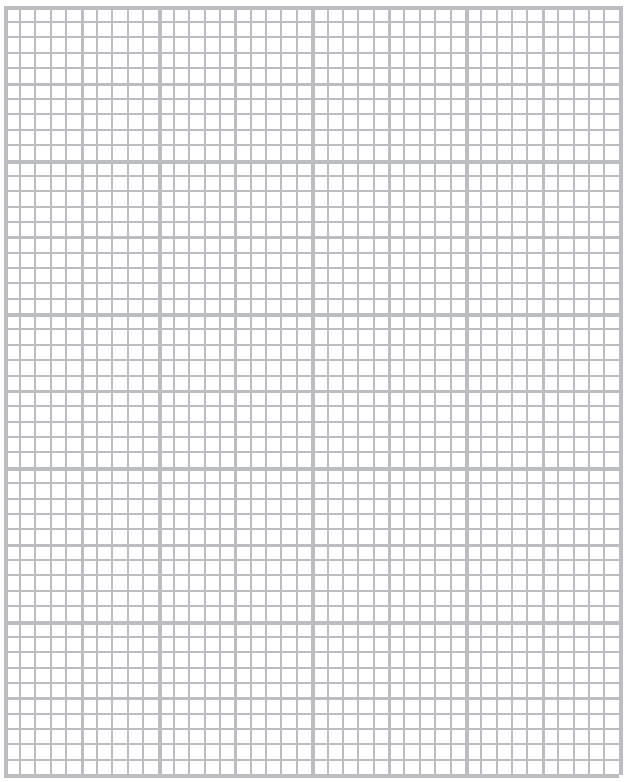
Leave blank

3. Mussels are animals that live on rocky sea shores, attached to rocks. They feed by filtering plankton (microscopic plants and animals) from seawater. The shore is covered by seawater twice a day because the sea rises and falls between the low-water and high-water marks. Mussels living near the low-water mark are covered by seawater for a longer time than the mussels living near the high-water mark.

An experiment was carried out to find the rate at which mussels from different places on the shore filter plankton out of seawater. The mussels were put into beakers containing plankton, and the percentage of plankton remaining in the water was measured every hour for four hours. The results are shown in the table below.

Time in hours	**Percentage of plankton remaining in beakers**	
	Mussels near high-water mark	Mussels near low-water mark
0	100	100
1	82	88
2	60	76
3	39	62
4	20	50

(a) Plot a graph of these results on the grid below. Join the points with straight lines.



(6)

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Leave blank

(b) Over the four-hour period the mussels from near the high-water mark removed plankton at the rate of 20% per hour. At what rate did the mussels from near the low-water mark remove plankton from the water?

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(1)

(c) Suggest an explanation for the relationship between the place where the mussels live on the shore and their filtering rate.

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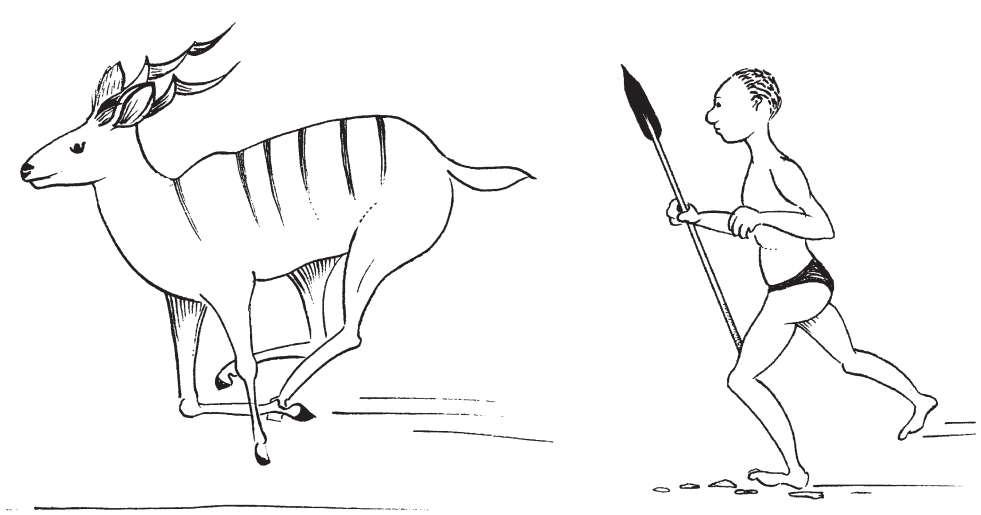
(2)

Q3

(Total 9 marks)

Leave blank

4. The diagram below shows a desert hunter hunting a type of antelope called a kudu.



During the hunt, the hunter runs after the kudu for hours in the hot desert temperatures. The body temperature of both the hunter and the kudu rises. The hunter is smaller and this helps him control his body temperature better than the kudu. The hunter is able to replace water lost from his body during the hunt by drinking from a container he carries.

When the body temperature of the kudu rises too high it collapses onto the ground. The hunter kills the kudu and eats its meat.

(a) Name the process that causes the body temperature to rise in the hunter and in the kudu.

.....

(1)

(b) Explain why the size of the hunter helps him control body temperature better than the kudu.

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(2)

(c) Explain how the changes to the blood vessels in the skin help the hunter control his body temperature.

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(2)

Leave blank

(d) Name **two** ways in which the hunter loses water from his body while he is running.

1 .....

2 .....

(2)

(e) Explain what could happen to the red blood cells of the hunter if he did not replace water lost during the hunt.

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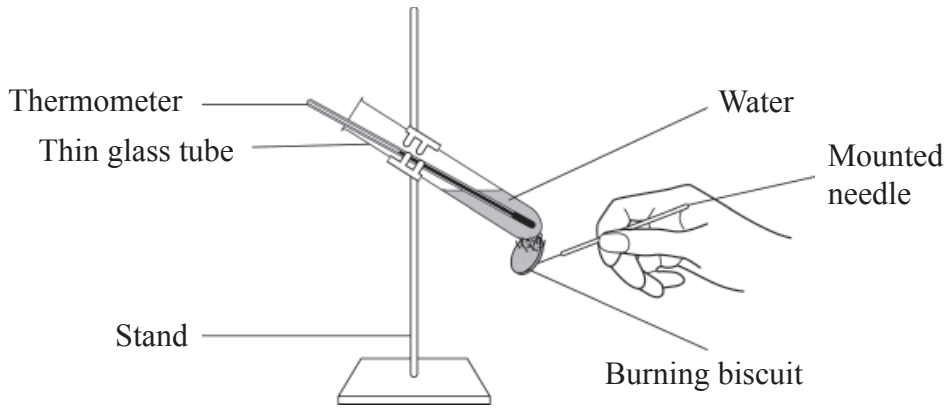
(3)

Q4

(Total 10 marks)

Leave blank

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



The student weighed the cheese biscuit and held it 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 20 cm^3 of water at 20 °C.

As the biscuit burned, its energy was transferred to the water in the tube. The temperature of the water rose to 43 °C.

She calculated the energy in the biscuit as follows:

Energy in joules = Mass of water × rise in temperature × 4.2

Note *4.2 = the energy in joules required to raise the temperature of 1 g of water by 1 °C. 1 cm^3 of water has a mass of 1 g.*

(a) (i) Calculate the energy (in joules) released when the biscuit was burned.

(3)

(ii) The mass of the biscuit was 0.2 g. Calculate the energy released per g of biscuit.

(1)

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Leave blank

(b) (i) The energy value given on the packet of biscuits was 22 340 joules per g. Suggest why the value determined by the student was very much lower.

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.....

.....

(2)

(ii) Suggest **one** way that the student could increase the accuracy of her experiment, and explain how it would lead to a more accurate result.

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.....

(2)

(c) The nutritional information provided on the side of the packet of biscuits stated that most of the energy was in the form of carbohydrates.

Describe **two** tests that you could carry out to show the presence of **two different** carbohydrates in the biscuits.

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.....

(5)

Q5

(Total 13 marks)

Leave blank

6. An industrial fermenter is a large container used to culture microorganisms.
Suggest and explain what effect each of the following would have on the growth of the microorganisms:

(a) A failure in temperature regulation.

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(3)

(b) A breakdown in the paddle stirrers.

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(3)

(c) A failure in the aseptic conditions.

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(2) **Q6**

(Total 8 marks)

TOTAL FOR PAPER: 60 MARKS

END

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Sample mark schemes

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.

Biology Paper 1

Question Number	Answer	Mark
1(a)	six	1

Question Number	Answer	Mark
1(b)	Any two from: • glucose • amino acid • fatty acid • glycerol	2

Question Number	Answer	Mark
1(c)	A – cell membrane	
	B – cytoplasm	
	C - nucleus	3

Question Number	Answer		Mark
2(a)	**Name of cell**	**Number of chromosomes in cell**	
	neurone	*46*	
	sperm	23	
	red blood cell	0	
	skin	46	3

Question Number	Answer	Mark
2(b)(i)	testis	1

Question Number	Answer	Mark
2(b)(ii)	egg / ovum	1

Question Number	Answer		Mark
3(a)	**Sentence**	**Number**	
	The number of organisms is	*5*	
	The number of producers is	2	
	The number of animals is	3	
	The number of food chains is	4	3

Question Number	Answer	Mark
3(b)(i)	decrease / eq	1

Question Number	Answer	Mark
3(b)(ii)	(ii) increase / eq	1

Question Number	Answer	Mark
4(a)(i)	X on middle arrow	1

Question Number	Answer	Mark
4(a)(ii)	spinal cord	1

Question Number	Answer	Mark
4(b)(i)	light	1

Question Number	Answer	Mark
4(b)(ii)	retina	1

Question Number	Answer	Mark
4(b)(iii)	optic nerve / sensory neurone electrical / impulses	2

Question Number	Answer	Mark
4(c)	Two marks for one sense organ + one stimulus. eg nose: smell skin: touch / pressure / temperature ears: sound / noise / balance tongue: taste	2

Question number	Answer		Mark
5	**Function**	**Donated body part**	5
	breaks down toxic chemicals	*liver*	
	produces urine	kidney	
	pumps blood around the body	heart	
	fills with air during breathing	lung(s)	
	bends light as it enters the eye	cornea	
	secretes insulin	pancreas	

Question number	Answer	Mark
6(a)	A-left ventricle B-tricuspid / atrioventricular valve	2

Question Number	Answer	Mark
6(b)	arrow into the right atrium arrow out of right ventricle through pulmonary artery	2

Question Number	Answer	Mark
6(c)	stop backflow of blood	1

Question Number	Answer	Mark
6(d)	One from: • more oxygen / oxygenated / brighter red • less carbon dioxide • greater pressure	1

Question number	Answer	Mark
7(a)	6.2; 6.0; 6.0; 5.8	4

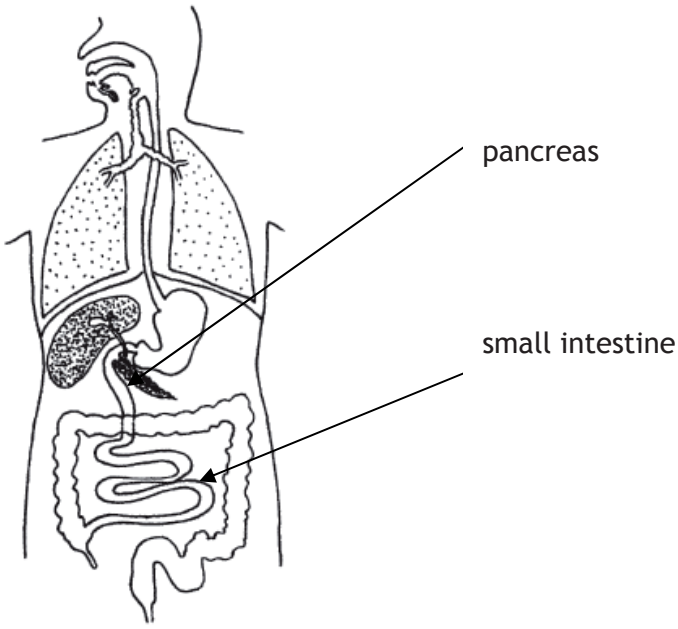
Question number	Answer	Mark
7(b)	8.2; Allow one for number divided by 4 in working	2

Question number	Answer	Mark
7(c)(i)	ice; Ignore fridge	1

Question number	Answer	Mark
7(c)(ii)	kill/cruel / unethical / cause harm / eq Ignore denatured	1

Question number	Answer				Mark
8	1 mark for each pair of Answers in each column				
	Nucleus	Cytoplasm	Cell wall	Chloroplast	
	✓	(✓)	×	×	
	×	✓	(✓)	(×)	
	(✓)	✓	✓	×	3

Question number	Answer	Mark
9	One mark for each point from the following to a maximum of five: • tar • coughing • effect on cilia • mucus build up • bronchitis • bacteria / microorganisms / infection • lung cancer / carcinogens • blockage to tubes/difficulty breathing / ventilation • emphysema • reduced surface area/less/damaged alveoli / less gas exchange less diffusion	5

Question number	Answer	Mark
10(a)		2

Question number	Answer	Mark
10(b)	1 mark for each of the following, maximum 4 • lipase works best with bile • (lipase works) least well in acidic solution / better in alkaline solutions • bile is alkaline / neutralizes / optimum pH /eq • bile emulsifies fat • larger surface area denature / affect active site	4

Question number	Answer			Mark
10(c)	**Enzyme**	**Food Molecule**	**Product of digestion**	
	amylase	starch	*maltose*	
	maltase	*maltose*	glucose	**2**

Question number	Answer	Mark
11(a)	transpiration / evaporation	**1**

Question number	Answer	Mark
11(b)	A Lost 0.02g + compared with B or C	**2**

Question number	Answer	Mark
11(c)	1 mark for each, maximum 2 from: • number of stomata • stomata size/opening • waxy cuticle; • hairs on surface • surface area / size / wider / eq • thickness • wind • light intensity • humidity temperature (do not credit environment/climate)	**2**

Question number	Answer	Mark
12(a)	oxygen	**1**

Question number	Answer	Mark
12(b)	move lamp different distances/ different wattage bulbs/less voltage	**1**

Question number	Answer	Mark
12(c)	count bubbles / measure volume per unit time	**2**

Question number	Answer	Mark
12(d)	line going up from origin line leveling at maximum rate of photosynthesis	**2**

Question number	Answer	Mark
12(e)	1 mark for each of the following, maximum 2: • temperature • carbon dioxide size of pondweed	2

Question number	Answer	Mark
13(a)(i)	36	1

Question number	Answer	Mark
13(a)(ii)	1 mark for each of the following, maximum 2: • 51/3rd result at 25 °C with vitamin C • not given long enough to warm up to 25 °C not enough Vit C / not enough yeast	2

Question number	Answer	Mark
13(a)(iii)	35 °C with (vitamin C)	2

Question number	Answer	Mark
13(b)(i)	1 mark for each of the following, maximum 3: • low kinetic energy / eq • high temp + denatured / destroyed • optimum/ best/ ideal / eq ref to gas / carbon dioxide bubbles / eq	3

Question number	Answer	Mark
13(b)(ii)	more rise / faster rise no difference at lowest / 15 and /or highest / 65 / at some temperatures	2

Question number	Answer	Mark
14(a)	600 9	2

Question number	Answer	Mark
14(b)(i)	LHS RHS balanced	3

Question number	Answer	Mark
14(b)(ii)	1 mark for each of the following, maximum 2: • not eaten / inedible • not digested/indigestible / egested • excreted / urine / sweating • movement • heat loss death/decomposers	2

Question number	Answer	Mark
14(c)	carnivores	1

Question number	Answer	Mark
15	• explants • agar / nutrient / growth • nutrients / minerals / growth regulators / glucose / H_2O / vitamins • nutrients / minerals / growth regulators / glucose / H_2O / vitamins • compost / soil / eq • temperature / carbon dioxide / light / humidity / water • temperature /carbon dioxide / light / humidity / water • clones identical	9

Question number	Answer	Mark
16(a)	adenine cytosine	2

Question number	Answer	Mark
16(b)	600	1

Question number	Answer	Mark
16(c)	Any five from: • restriction enzyme / endonuclease • cut DNA/gene • ligase • join/insert/stick/put into DNA/eg • plasmid(s) • vector • recombinant DNA/recombinant bacteria	5

Question number	Answer	Mark
17(a)(i)	Parent genotypes: male + Hh female + hh Gametes: H h (h) h Offspring genotypes: Hh **and** hh • Offspring phenotypes: Huntingdon's disease normal	**4**

Question number	Answer	Mark
17(a)(ii)	¾/eq	**1**

Question number	Answer	Mark
17(b)	would have children already / gene already passed on wouldn't know they had Huntington's	**2**

Question number	Answer	Mark
18	**Any six from:** • **C —** low/high temperatures/different temperatures • **O —** named species of leaves/eq • **R —** idea of replication • **M1 —** mass of leaves /eq • **M2 —** stated time period • **S1 —** moisture/oxygen supply/decomposers/eq • **S2 —** moisture/ oxygen supply/decomposers/eq	**6**

Biology Paper 2

Question number	Answer	Mark
1(a)	more / lots / all offspring can feed (at once) / reduce competition/enable feeding when one teat empty	1

Question number	Answer	Mark
1(b)	lose more heat / energy / need more energy fat has a high energy content fat stored / insulator / keep warm (ref to blubber)	2

Question number	Answer	Mark
1(c)	very young need protein for growth older need / use fat for energy / keep warm	2

Question number	Answer	Mark
1(d)	hormone function	2

Question number	Answer	Mark
1(e)	stop metabolising body tissues prevents mother dying / allows mother to survive	2

Question number	Answer	Mark
1(f)	no need to clean water / sterilisation of equipment / prevent infection antibodies / provides immunity to disease correct composition / all of CHO, fats, minerals and vitamins cheaper / easier / more convenient / correct temperature	3

Question number	Answer	Mark
2(a)	chloride	1

Question number	Answer	Mark
2(b)	magnesium; (1 mark) Plus any two from the following: • high(er) concentration (in pond) • low(er) in plant cells • concentration / diffusion gradient	3

Question number	Answer	Mark
2(c)	• chlorophyll production	1

Question number	Answer	Mark
2(d)	Any three from: • active transport / active uptake • against concentration gradient • respiration • aerobic • requires energy / ATP	3

Question number	Answer	Mark
3(a)	scale linear + half or over of grid (2) (IF non linear – no mark) line clear + labelled (High and Low) (1) axes correct + labelled (% plankton Time in hours) (2) • points correctly plotted (1)	6

Question number	Answer	Mark
3(b)	• 12.5	1

Question number	Answer	Mark
3(c)	mussels at high water faster less time (to feed / filter)	2

Question number	Answer	Mark
4(a)	respiration	1

Question number	Answer	Mark
4(b)	Two from: smaller / smaller surface area larger surface area to volume ratio	2

Question number	Answer	Mark
4(c)	Two from: vasolidation blood vessels (NOT capillaries) widen / dilate / eq	2

Question number	Answer	Mark
4(d)	sweating breathing / exhalation / eq	2

Question number	Answer	Mark
4(e)	Three from: less water in blood / blood concentrated / eq (cells) lose water osmosis crenate / shrink / crumple / buckle / eq	3

Question number	Answer	Mark
5(a)(i)	23 x 20 x 4.2 = 1932 (1932 alone = 3 marks) If wrong temp. allow transfer error for up to 2 marks	3

Question number	Answer	Mark
5(a)(ii)	9660 Allow transfer error from part i	1

Question number	Answer	Mark
5(b)(i)	idea of heat / energy lost cause of heat loss: (eg heat lost to the surroundings = 2 marks)	2

Question number	Answer	Mark
5(b)(ii)	Change to method Explanation (eg insulate the test tube reduces heat loss = 2 marks)	2

Question number	Answer	Mark
5(c)	use <u>iodine test for starch</u> blue black if +ve use <u>Benedicts test for glucose / reducing sugar</u>; heat brick red / yellow / green / orange if +ve (if sugar stated allow heat and colour change for 2 marks)	5

Question number	Answer	Mark
6(a)	(if temperature rises) increase rate of respiration / production greater kinetic energy rate of reaction up to max then falls denaturing of enzymes	3

Question number	Answer	Mark
6(b)	lack of mixing of reactants / oxygen less oxygen available slows rate of aerobic respiration / makes conditions anaerobic different products formed	3

Question number	Answer	Mark
6(c)	growth of unwanted bacteria / fungi / micro organism competition for resources reduction in desired product / contamination of product	2

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