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Surname					Other names									
Pearson Edexcel					Centre Number					Candidate Number				
International GCSE (9-1)					<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>					<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>				
<h1>Science (Single Award)</h1> <h2>Biology</h2>														
Sample Assessment Materials for first teaching September 2017										Paper Reference				
Time: 1 hour 10 minutes										4SS0/1B				
You must have: Calculator, ruler										Total Marks				

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Calculators may be used.
- 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

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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

1 All living organisms have certain characteristics.

(a) Describe what is meant by the following characteristics:

(i) respiration

(2)

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(ii) control of their internal conditions

(2)

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(b) Organisms are organised into different levels.

What is the correct order of the levels?

(1)

- A** organ, system, tissue, cell, organelle
- B** organ, tissue, cell, system, organelle
- C** organelle, cell, tissue, organ, system
- D** system, cell, organelle, organ, tissue

(c) Yeast is an example of which group of organism?

(1)

- A** animals
- B** bacteria
- C** fungi
- D** protoctists

(Total for Question 1 = 6 marks)

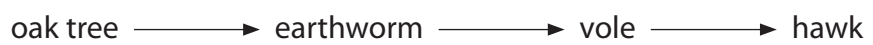
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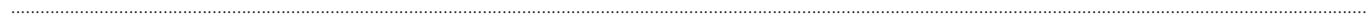
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2 Feeding relationships can be shown using food chains.

This food chain comes from a woodland ecosystem.



(a) Name the secondary consumer in this food chain. (1)



(b) (i) Draw a pyramid of numbers for this food chain. Label your pyramid. (3)

(ii) Describe how a pyramid of biomass would look different to a pyramid of numbers. (2)



(iii) Explain why the biomass changes moving up the pyramid. (3)



(Total for Question 2 = 9 marks)

(ii) Give **two** ways in which the design of the study could be improved.

(2)

1

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2

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(b) The diameter of a capillary is $8.0\ \mu\text{m}$ and the diameter of the aorta is $25.0\ \text{mm}$.

$1000\ \mu\text{m} = 1\ \text{mm}$

(i) Calculate the ratio of the diameter of the aorta to the diameter of the capillary.
Show your working.

(2)

ratio =

(ii) Explain why the aorta has a thicker wall than the capillary.

(2)

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(Total for Question 3 = 11 marks)

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4 Genetic conditions can be controlled by dominant alleles or by recessive alleles.

(a) Explain **one** difference between a dominant allele and a recessive allele.

(2)

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(b) Sickle cell anaemia is a genetic condition that results in the formation of abnormal red blood cells.

Sickle cell anaemia is controlled by a gene with two alleles. The allele (N) produces normal red blood cells and the allele (n) produces abnormal red blood cells.

Two parents who are both heterozygous plan to have children.

Use a genetic diagram to show the parent genotypes, the gametes produced and all the possible genotypes and phenotypes of their offspring.

(3)

Parent genotypes

Gametes

Offspring genotypes

Offspring phenotypes

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(c) Individuals who are heterozygous for sickle cell anaemia are protected from malaria.

Suggest how this would affect the number of individuals born with sickle cell anaemia in parts of the world where malaria is common.

(4)

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(Total for Question 4 = 9 marks)

5 Plants make sugars by the process of photosynthesis.

(a) (i) Which of the following factors is least likely to limit the rate of photosynthesis?

(1)

- A carbon dioxide concentration
- B light intensity
- C oxygen concentration
- D temperature

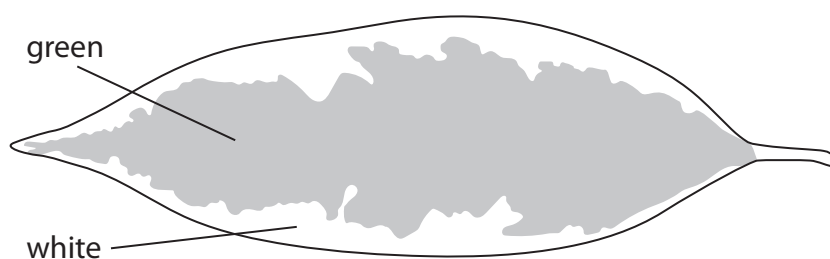
(ii) Which combination of factors is most likely to limit the rate of photosynthesis in the early morning?

(1)

- A carbon dioxide concentration and soil pH
- B temperature and light intensity
- C water content of soil and soil pH
- D water content of soil and light intensity

(b) A student carried out an experiment to investigate the need for chlorophyll in photosynthesis.

He uses a variegated leaf as shown.



The green part of the leaf has cells that contain chlorophyll. The white part of the leaf has cells that do not contain chlorophyll.

(i) Describe the procedure used to test this leaf for starch.

(4)

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(ii) Draw a labelled diagram of the leaf to show its appearance after the student had completed the test for starch.

(2)

(c) Suggest a method the student could use to measure the area of the green part of the leaf.

(2)

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(Total for Question 5 = 10 marks)

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6 Describe an experiment you could carry out to determine the effect of pH on the rate of digestion by amylase.

Your answer should include experimental details and be written in full sentences.

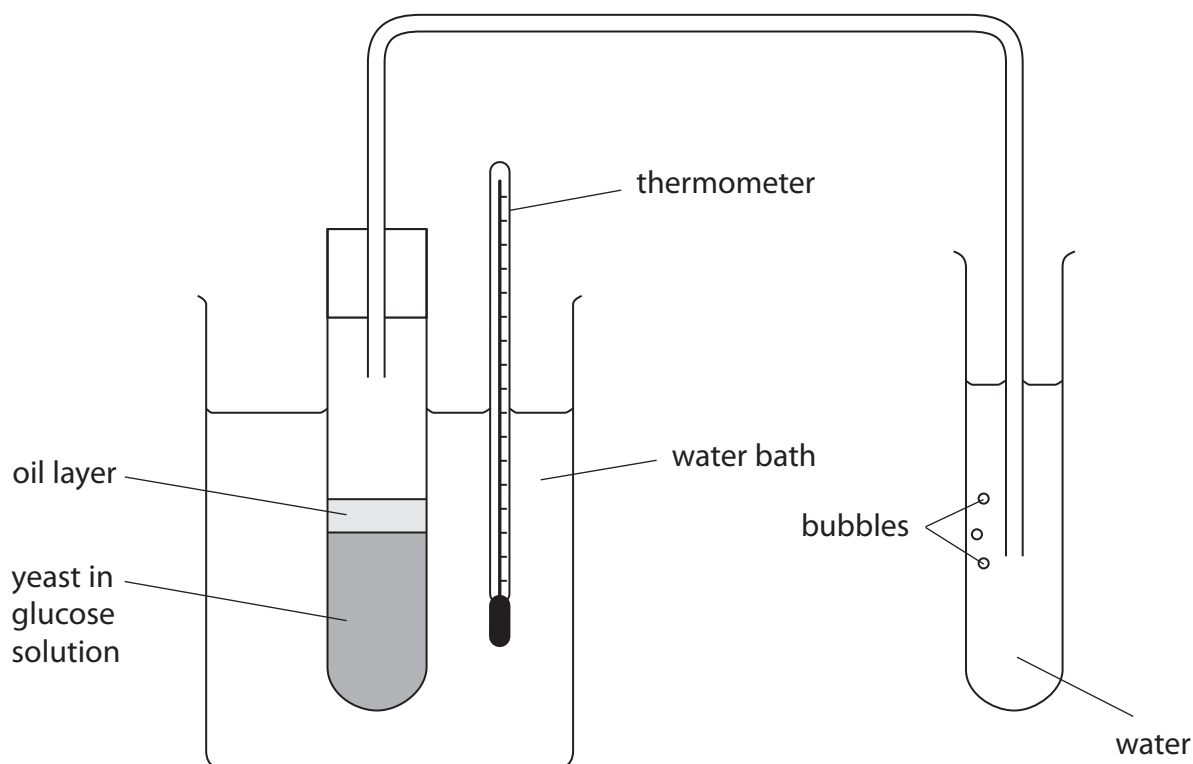
(6)

Dotted lines for writing the answer.

(Total for Question 6 = 6 marks)

- 7 A student wants to investigate the effect of temperature on the rate of anaerobic respiration by yeast.

She set up this apparatus.



- (a) The oil layer prevents the entry of air into the glucose solution.

Explain why this is necessary.

(2)

(b) The student varies the temperature of the water bath between 15 °C and 60 °C.

She measures the rate of respiration by counting the number of carbon dioxide bubbles produced per minute.

These are her results.

Temperature / °C	Number of bubbles produced in one minute				
	trial 1	trial 2	trial 3	trial 4	trial mean
15	6	7	5	5	6
20	7	8	7	9	8
35	10	12	11	14	
45	12	15	14	16	14
60	3	2	1	2	2

(i) Calculate the mean number of bubbles produced in one minute at 35 °C. (2)

mean number of bubbles in one minute =

(ii) Calculate the percentage change in the mean number of bubbles produced in one minute as the temperature increases from 15 °C to 45 °C. (2)

percentage change =%

(iii) Explain the change in the rate of respiration by yeast as the temperature increases from 45 °C to 60 °C.

(3)

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(Total for Question 7 = 9 marks)

TOTAL FOR PAPER = 60 MARKS

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