ST EDWARD'S

OXFORD

16+ ENTRANCE EXAMINATION

For entry in
September 2017

Biology

(Use of a calculator is permitted)

Time: 1 hour

Candidate First Name: ……

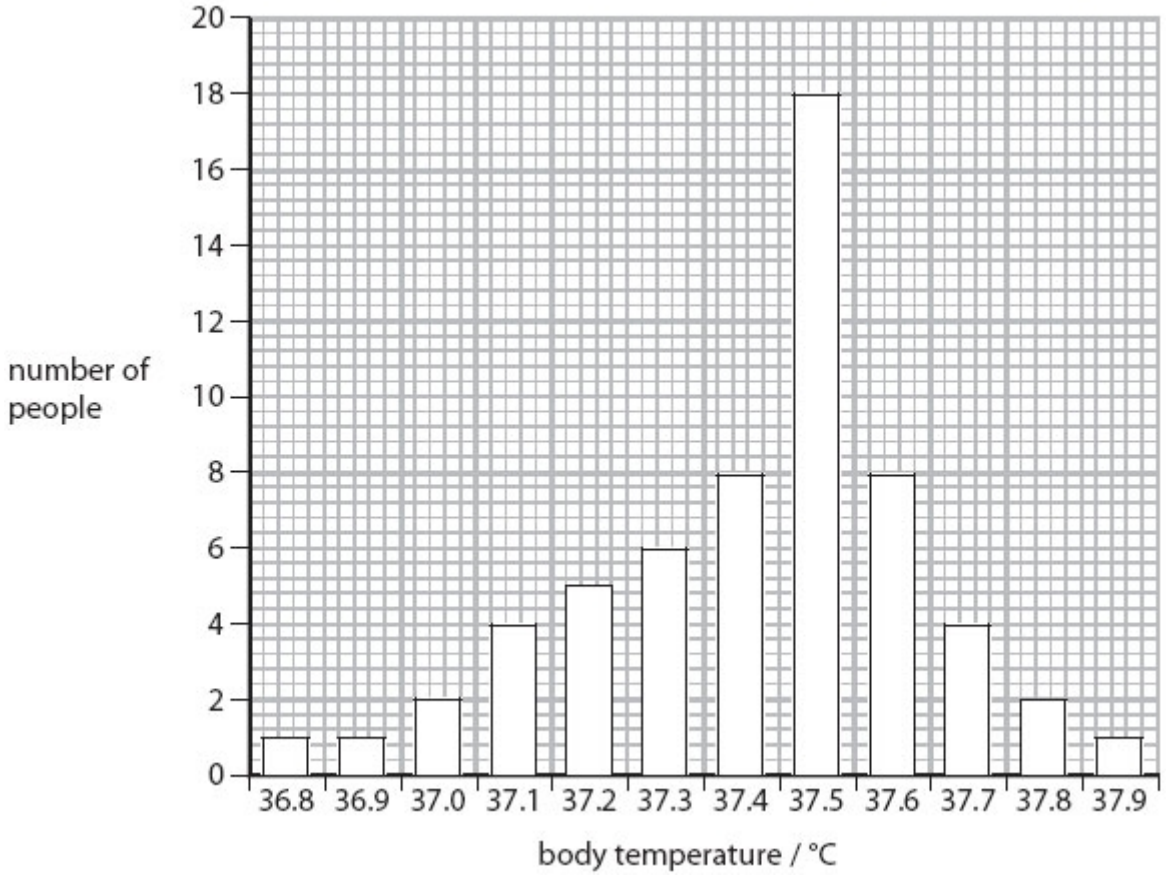
Candidate Surname: ……

Total Marks available: 58 marks

For St Edwards us only:

Total Marks scored: _____ marks

Q1. The graph shows the body temperature of 60 people.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The range in body temperature is

(1)

☒ **A** 0.1

☒ **B** 1.1

☒ **C** 11.0

☒ **D** 11.1

(ii) State the type of variation, shown in the graph, that results in a normal distribution curve.

(1)

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(iii) Calculate the percentage of people with a body temperature of 37.5 °C.

(2)

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Q2.

Bacteria are examples of pathogens.

They can cause humans to become ill.

(a) (i) State **two** physical barriers the body has to protect itself from pathogens.

(2)

1.....

2 .....

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Salmonella bacteria can cause disease, these bacteria get into the body by

(1)

- ☒ **A** being bitten by a mosquito
- ☒ **B** breathing in
- ☒ **C** drinking bottled water
- ☒ **D** eating contaminated food

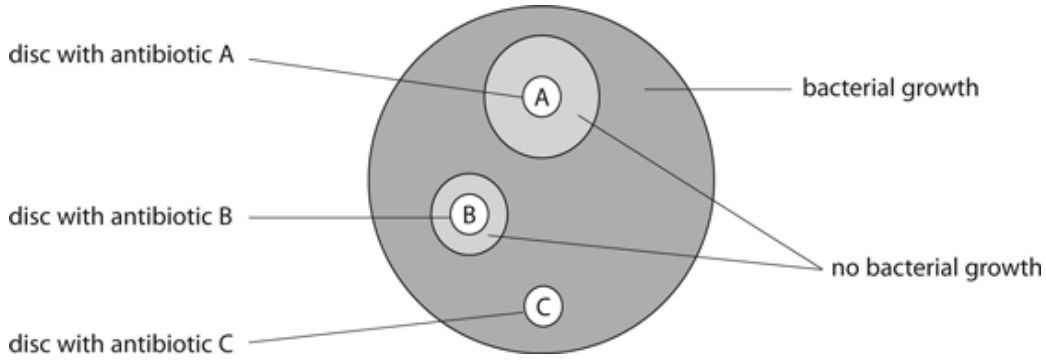
(b) Lisa was investigating the effect of three different antibiotics on the growth of bacteria.

Lisa left the *Salmonella* bacteria to grow on an agar plate for a week with three discs each containing a different antibiotic A, B or C.

The diagram shows the results of the experiment.

The dark grey area shows bacterial growth.

The light grey area shows where the bacteria did not grow.



(i) Measure the width of the no bacterial growth for antibiotic A and antibiotic B.

Calculate the difference between the two widths.

(2)

difference = ... cm

(ii) Before the experiment Lisa predicted that: 'All the discs would work and no growth of *Salmonella* would be found around the discs'.

Explain why this prediction was **incorrect**.

Use the results for all three antibiotics in your explanation.

(2)

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(iii) Chemicals, other than antibiotics, can be used to prevent bacterial growth.

Give the name of one of these chemicals.

(1)

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Q3. The effect of caffeine on reaction time was investigated.

A person was given a drink and then their reaction time was measured.

drink	reaction time/ms
cola with caffeine	198
cola without caffeine	250
water	254

(ii) State the effect of caffeine on reaction time.

(1)

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(ii) Explain the effect of caffeine on reaction time.

(2)

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(iii) Explain why water was one of the drinks used in this investigation.

(2)

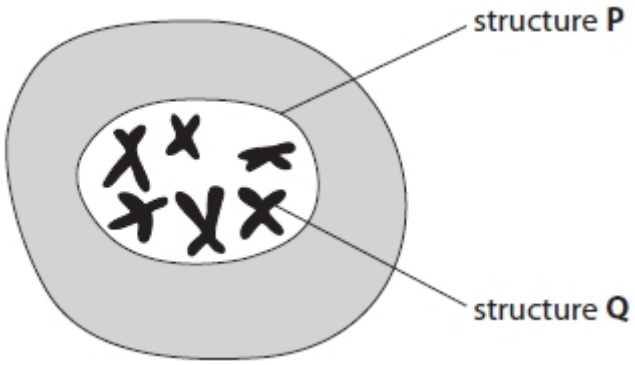
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Q4. The diagram shows a cell.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Structure **P** is the

(1)

☒ **A** chloroplast

☒ **B** gene

☒ **C** cytoplasm

☒ **D** nucleus

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Structure **Q** is a

(1)

☒ **A** chromosome

☒ **B** cell wall

☒ **C** cell membrane

☒ **D** phenotype

(iii) A gene can exist in alternative forms.

State the genetic term used for an alternative form of the same gene.

(1)

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Q5. * Describe how scientists classify vertebrates into different groups.

(6)

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Q6. The concentration of carbon dioxide in two areas of a rainforest was measured. Each measurement was taken three times.

Area A was full of large trees and area B was an area where most of the trees had been removed.

area	carbon dioxide concentration (%)			
	1	**2**	**3**	**Mean**
area A	0.025	0.028	0.022	0.025
area B	0.036	0.031	0.032	

(i) Calculate the mean carbon dioxide concentration in area B.

(2)

mean carbon dioxide concentration = ... %

(ii) Explain why all the carbon dioxide concentration readings for area B are higher than for area A.

(2)

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Q7. The dodo was a flightless bird which is now extinct.

The photograph shows the skeleton of a dodo.



The dodo lived on the small island of Mauritius. It became extinct in 1681.

Using your knowledge of natural selection, suggest why the dodo may have become extinct.

(3)

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Q8. The photograph shows a mistletoe plant growing on a tree.

The mistletoe plant uses nutrients from the tree.

This can cause the tree to die.



(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The relationship between the mistletoe plant and the tree is an example of

(1)

☒ **A** mutualism

☒ **B** parasitism

☒ **C** phototropism

☒ **D** symbiosis

(ii) The mistletoe plant also gains energy from sunlight to produce glucose.

State the name of this process.

(1)

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(b) The mistletoe plant produces fruit that contains seeds. The Mistle Thrush is a bird that spreads these mistletoe seeds to other trees.

(i) Suggest how the Mistle Thrush spreads the mistletoe seeds to other trees.

(2)

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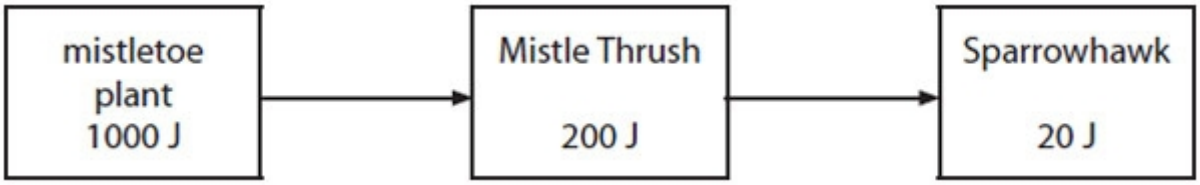
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(ii) Sparrowhawks are birds that are predators of the Mistle Thrush.

The diagram shows the energy values in the food chain for these organisms.



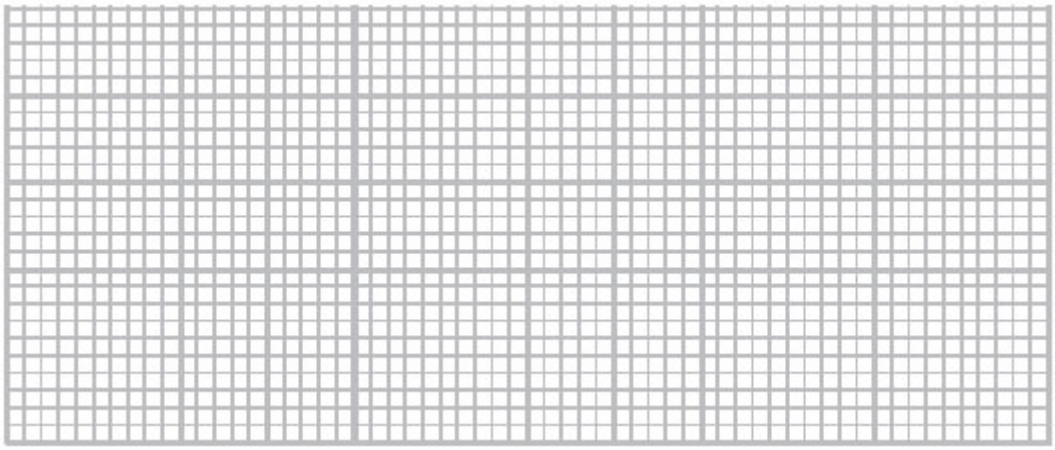
Calculate the percentage of energy that was passed from the mistletoe plant to the Mistle Thrush.

(2)

answer = ... %

(iii) Draw a pyramid of energy for this food chain.

(2)



(iv) Suggest **two** ways in that energy is lost from this food chain.

(2)

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Q9. (i) State **one** physical barrier, in the human body, that helps prevent disease.

(1)

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(ii) Describe **one** chemical barrier, in the human body, that helps prevent disease.

(2)

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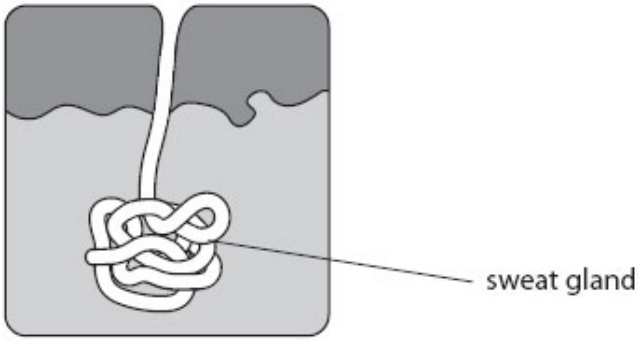
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Q10.

The diagram shows a sweat gland in a section of skin.



Explain how the sweat gland helps to cool the body.

(2)

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Q11.

(a) A scientist investigated the effect of a drug on the reaction times of three volunteers.

Volunteer **A** took 2 doses of the drug.

Volunteer **B** took 1 dose of the drug.

Volunteer **C** did not take the drug.

The scientist repeated his investigation three times.

The results are shown in the table.

volunteer	1st reaction time / ms	2nd reaction time / ms	3rd reaction time / ms	mean reaction time / ms
A	17	25	24	22
B		38	40	41
C	62	70	63	65

(i) Calculate the missing reaction time for volunteer **B**.

(2)

answer = ... ms

(ii) Using information from the table, describe the effect of this drug on reaction time.

(2)

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(iii) Explain how this drug causes a change in reaction time.

(2)

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(iv) Complete the sentence by putting a cross (☒) in the box next to your answer.

The type of drug that causes the effect shown in this investigation is a

(1)

- ☒ **A** depressant
- ☒ **B** hallucinogen
- ☒ **C** painkiller
- ☒ **D** stimulant

(b) Describe how a reflex arc helps to protect the human body from danger.

(3)

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End of Paper