

Surname	Centre Number	Candidate Number
Other Names		2



GCE AS/A level

1072/01 – **LEGACY**



BIOLOGY – BY2

P.M. TUESDAY, 7 June 2016

1 hour 30 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	9	
2.	7	
3.	16	
4.	6	
5.	9	
6.	13	
7.	10	
Total	70	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use pencil or gel pen. Do not use correction fluid. Write your name, centre number and candidate number in the spaces at the top of this page. Answer **all** questions. Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question. You are reminded of the necessity for good English and orderly presentation in your answers. The quality of written communication will affect the awarding of marks.

Answer all questions.

1. (a) Photograph **A** below is of a mistletoe plant, *Viscum album*, attached to the branch of a tree. Photograph **B** shows an enlarged image of the mistletoe plant. Mistletoe plants attach to and penetrate the branches of a tree in order to obtain water and nutrients from the tree. This commonly reduces the growth of the host tree and can kill the portion of branch it grows on.



Photograph **A**



Photograph **B**

- (i) Explain why mistletoe is referred to as being a parasite. [1]

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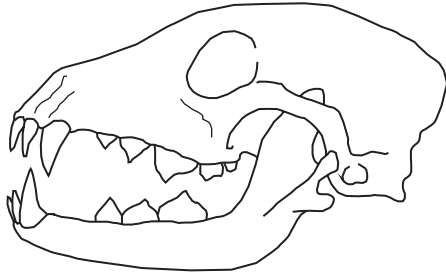
- (ii) Mistletoe however is only partially parasitic. Use the information provided to explain this statement. [2]

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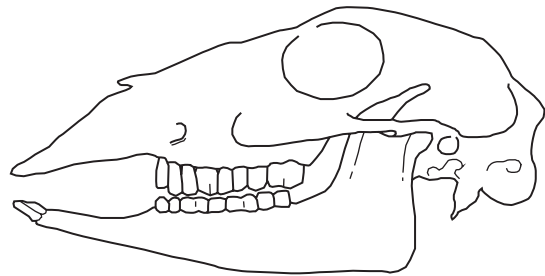
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(b) The diagrams below show the skulls of two different animals. For each of the animals, state their **mode of nutrition** and explain how their **dentition** is adapted to their mode of nutrition.



Animal X



Animal Y

Animal X

[3]

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Animal Y

[3]

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2. (a) Below is a photograph of the dragonfly, *Aeshna caerulea*, which inhabits wetland areas of Scotland.



- (i) State the name of the phylum to which it belongs. [1]

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- (ii) State **two** characteristics, shown by the dragonfly, which could be used to place it into its phylum. [2]

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- (iii) What is meant by the term *genus*? [1]

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- (iv) State the genus to which this dragonfly belongs. [1]

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- (b) Both dragonflies and birds have wings that enable them to fly, but are placed in different taxonomic groups. What conclusions can be drawn about the evolution of these structures? [2]

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(c) Explain why guard cells are important to the functioning of the plant.

[2]

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(d) Explain the mechanism which causes the stomatal pores to open.

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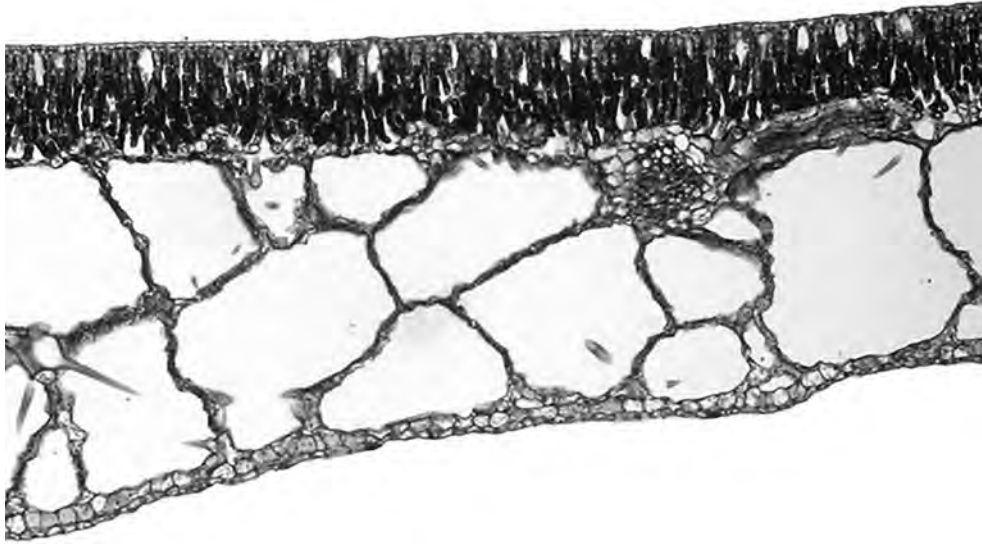
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- (e) The photograph below is of a transverse section of a leaf from a different type of plant from that in part (a). Both photographs are of the same scale.



State the **type** of plant from which this leaf was taken, giving reasons for your choice. [3]

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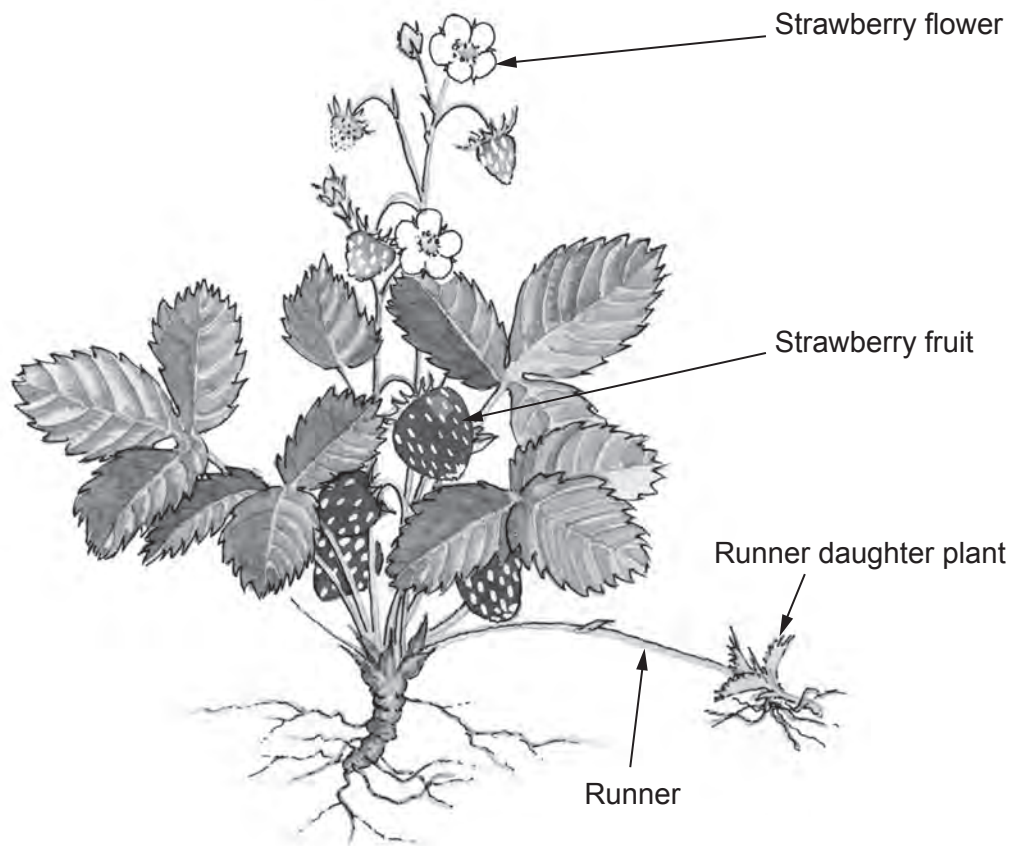
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4. This image shows a strawberry plant which is producing flowers and runners at the same time.



(a) Explain the advantage of the reproductive strategy shown by the plant above. [3]

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(b) Frogs and crocodiles are adapted to survive both on land *and* in water. Explain why frogs must return to the water to reproduce whereas crocodiles do not. [3]

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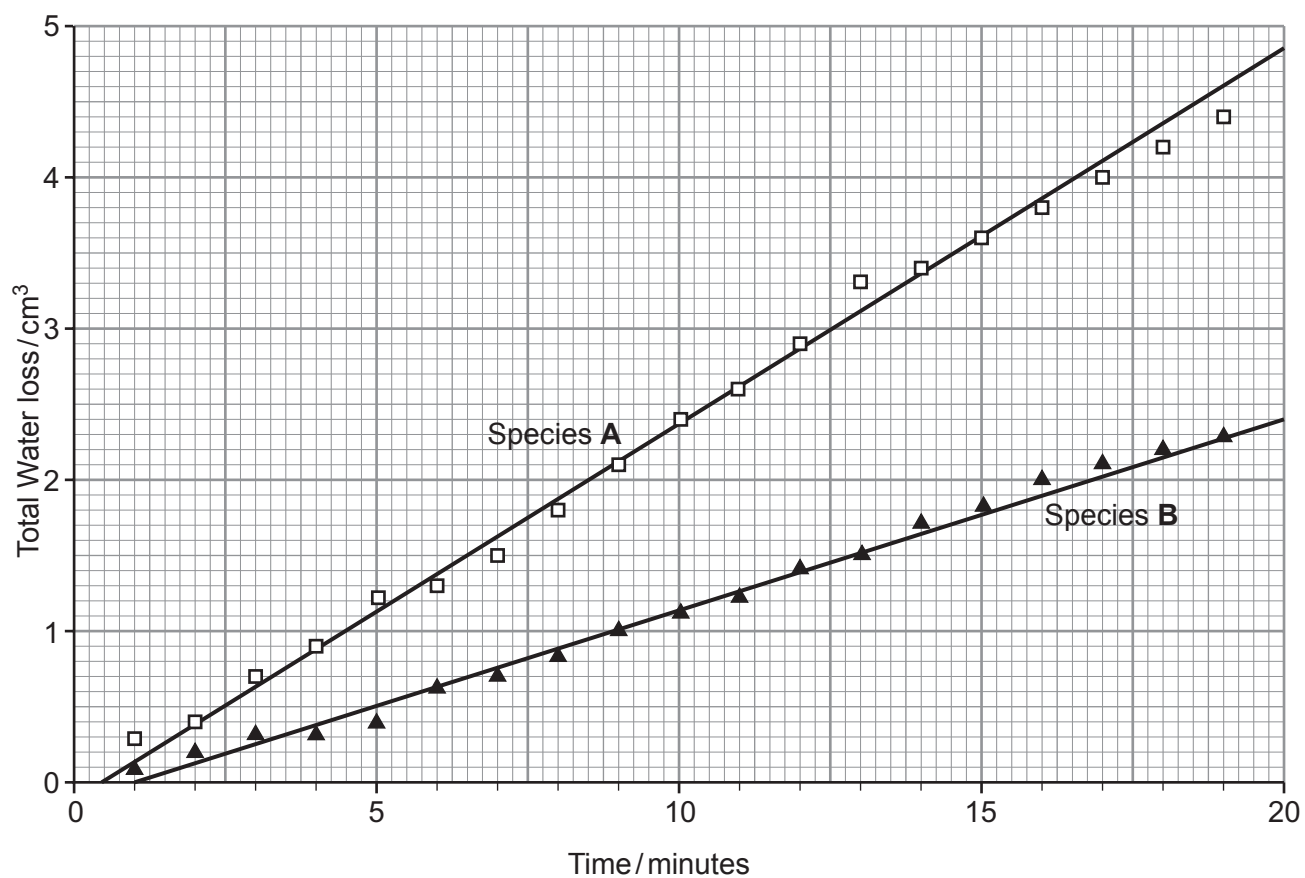
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5. (a) A student set up an experiment to investigate the rate of transpiration in two different species of plant. The data collected are shown in the graph below.



- (i) State the name of the equipment that the student would have used to collect this data. [1]

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(ii) Describe how the student would have used this equipment to collect the data shown. [3]

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(b) Using the data from the experiment, calculate the rate of transpiration for species **A** between 5 and 15 minutes. [2]

Rate of transpiration = $\text{cm}^3\text{min}^{-1}$

(c) (i) Suggest the type of environment to which species **B** might be adapted. [1]

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(ii) Describe and explain **one** structural adaptation of the leaves of plant species **B** that could account for the rate of transpiration shown in the graph. [2]

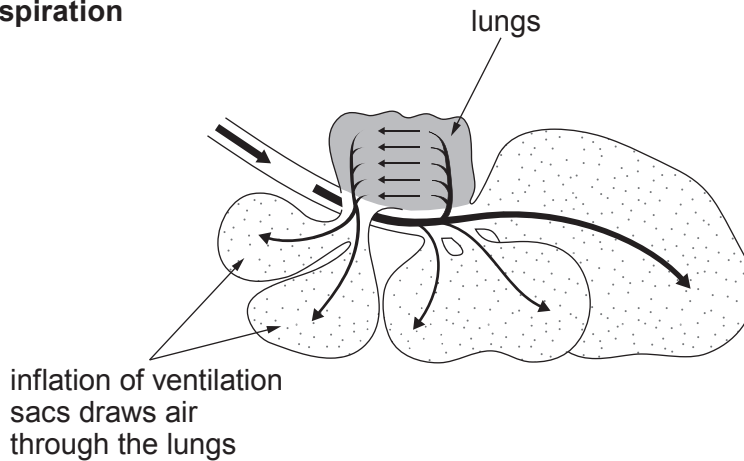
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6. The following passage has been adapted from the book 'Life Ascending' by Nick Lane:

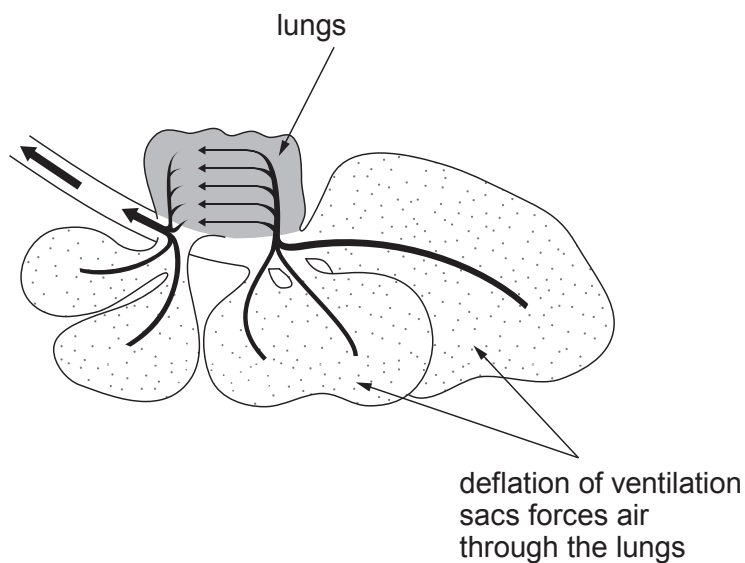
'Bird lungs are more efficient than mammal's lungs even at low altitudes. At high altitudes birds can extract more oxygen from the air than mammals. This is why migrating bar-headed geese (Anser indicus) can fly thousands of feet above the top of Everest.'

Birds have a sophisticated one way system of interconnected ventilation sacs. Rather than entering the lungs directly, air first flows into the ventilation sacs and eventually exits via the lungs, giving a continuous through-flow of air through the lungs.

Inspiration



Expiration



'Air flows continuously in the same direction through the lungs during both inspiration and expiration, while blood flows in the opposite direction, giving a highly efficient counter-current exchange of gases.'

(a) Describe **three** features of the gas exchange surface in the goose. [3]

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(b) What is the advantage of birds having internal lungs for gas exchange? [1]

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(c) Explain why the counter-current exchange of gases is beneficial to the bar-headed goose. [4]

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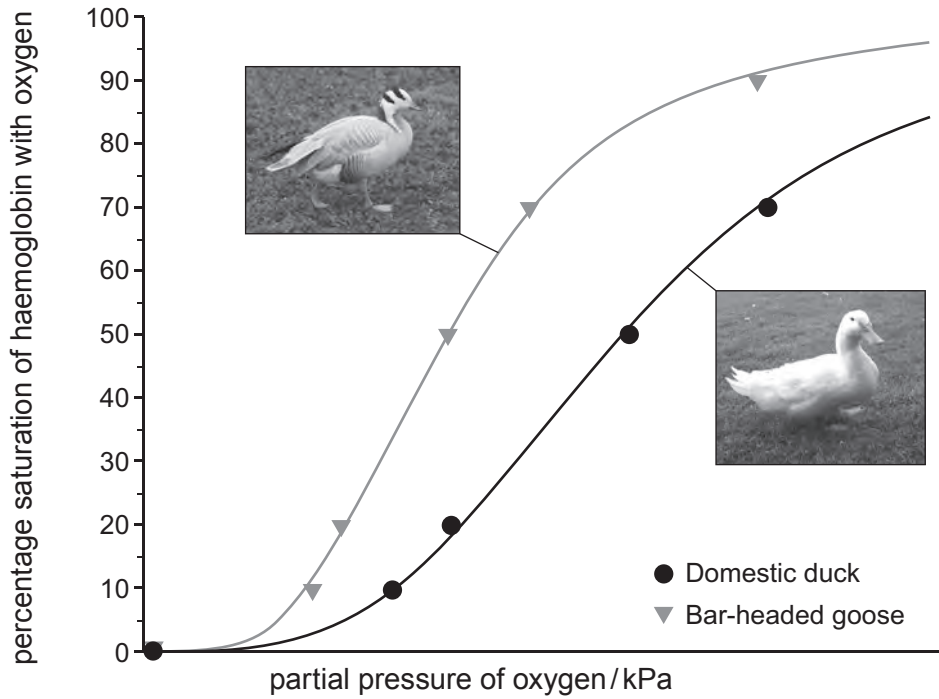
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(d) The diagram below shows the oxygen-haemoglobin dissociation curve for the bar-headed goose and a domestic duck.



(i) Use the information provided, and your own knowledge, to explain the relative position of the oxygen-haemoglobin dissociation curve for the bar-headed goose and suggest the importance of this. [4]

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- (ii) What is the disadvantage to the bar-headed goose of the position of the dissociation curve? [1]
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