

**Tuesday 15 January 2013 – Afternoon**

**AS GCE BIOLOGY**

**F212/01** Molecules, Biodiversity, Food and Health

Candidates answer on the Question Paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Electronic calculator
- Ruler (cm/mm)

**Duration:** 1 hour 45 minutes  
**MODIFIED LANGUAGE**




Candidate forename		Candidate surname	
Centre number		Candidate number	

### INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined pages at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

### INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **100**.
-  Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **24** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 For part of their life cycle, many insects live in freshwater habitats such as rivers and ponds.

Fig. 1.1 shows a labelled diagram of a generalised insect and diagrams of six common insects found in freshwater in the UK.

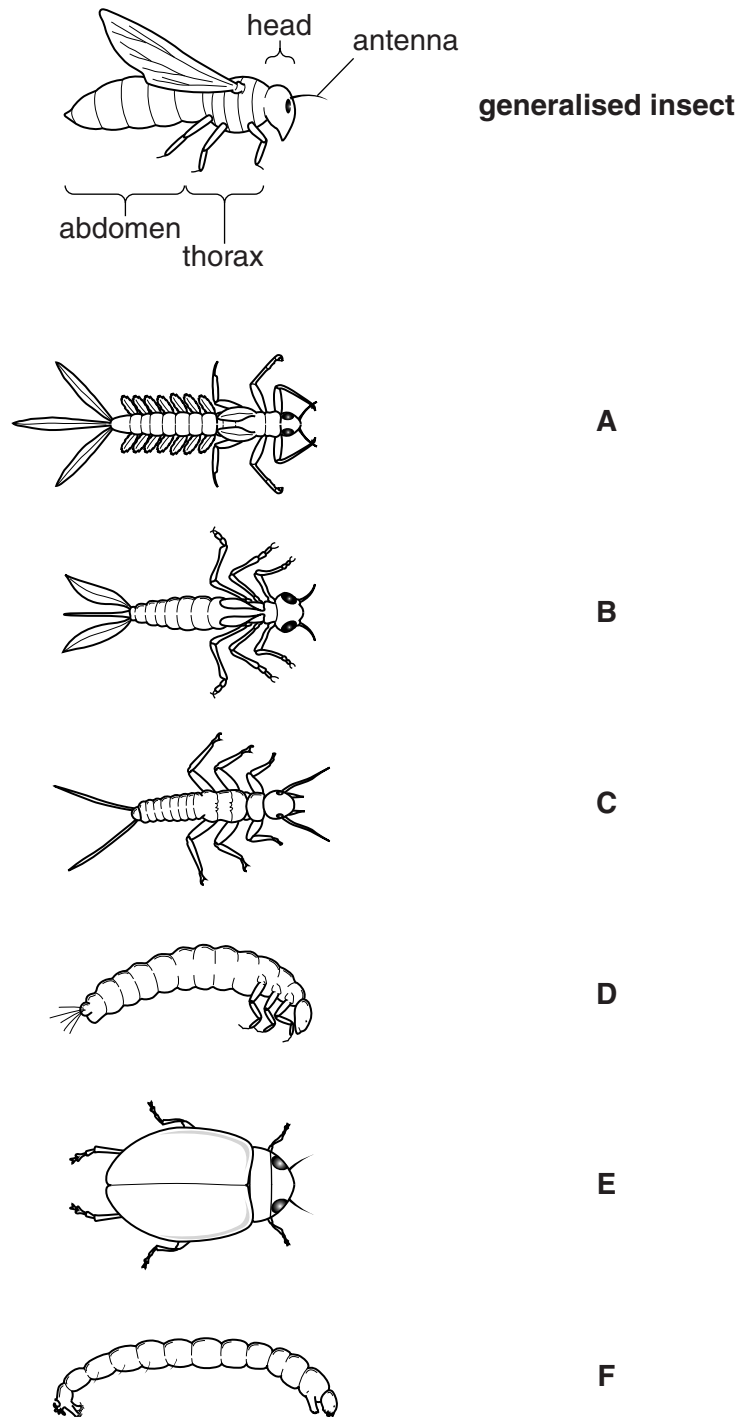


Fig. 1.1

Table 1.1 below shows a dichotomous key used for the classification of insects.

<b>Key:</b>			
<b>Question 1</b>	Does it have jointed limbs?	yes no	go to question 2 <b>bloodworm</b>
<b>Question 2</b>	Does it have an oval body shape?	yes no	<b>diving beetle</b> go to question 3
<b>Question 3</b>	Is the length of the tail greater than the length of three abdominal segments?	yes no	go to question 4 <b>caddis fly larva</b>
<b>Question 4</b>	Are gills attached to the abdominal segments?	yes no	<b>mayfly larva</b> go to question 5
<b>Question 5</b>	Does it have two narrow tails?	yes no	<b>stonefly larva</b> <b>damsel fly larva</b>

**Table 1.1**

(a) (i) Use Table 1.1 to identify the insects labelled **A** to **F** shown in Fig. 1.1.

**A** .....

**B** .....

**C** .....

**D** .....

**E** .....

**F** .....

[2]

(ii) Why is the key in Table 1.1 called a *dichotomous* key?

.....

..... [1]

(b) Suggest an adaptation shown by **at least one** of the insects in Fig. 1.1 that allows the insects to live in an aquatic habitat.

.....

..... [1]

(c) Insects belong to the animal kingdom within the domain *Eukaryota*.

- (i) Suggest **one** feature of the cells of insects that would identify insects as belonging to the domain *Eukaryota*.

.....  
..... [1]

- (ii) State **two** features that are present in the eukaryotic cells of plants that are **absent** from the cells of insects.

1 .....  
2 ..... [2]

[Total: 7]

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**Question 2 begins on page 6**

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- 2 (a) In 2009, many people in the UK caught a type of influenza called 'swine flu'.

'Swine flu' was caused by a new strain of the influenza virus.

The influenza virus is usually described as a *pathogen* and not as a *parasite*.

Explain why.

.....

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.....

.....

..... [3]

- (b) When a person is infected with a virus, an immune response is triggered.

(i) Define the term *immune response*.

.....

.....

.....

..... [2]

**(ii)** One type of cell involved in an immune response is a plasma cell.

A plasma cell releases antibodies.

Plasma cells contain RNA.

Outline the roles of RNA in plasma cells.



*In your answer you should write about the different roles of RNA.*

[6]

- (iii) Outline **two** ways in which antibodies reduce the threat from pathogens.

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..... [4]

- (c) (i) The government tries to reduce the effects of many people having influenza by encouraging key groups to be immunised against the virus. Two of these key groups are the elderly and children with another risk factor.

Suggest **two other** groups of people who should be immunised **and** explain why immunisation is important for them.

1 .....

.....

.....

.....

.....

2 .....

.....

.....

.....

..... [4]

- (ii) Immunisation of large numbers of people costs the UK government a lot of money.

Immunisation has a direct effect on health and reduces the number of deaths from influenza.

Suggest **one** other reason why immunisation is a good idea.

.....

.....

..... [1]



- (iii) A lot of the money spent on immunisation programmes is used to tell people about the benefits of immunisation. Most people know about the reasons for immunisation, but some people choose **not** to be immunised.

Suggest **one** reason why.

.....

.....

..... [1]

[Total: 21]

**Question 3 begins on page 10**

Some enzymes, such as the enzymes found in cytoplasm, are described as ..... enzymes. Others, such as the enzymes that digest food in the small intestine, are known as ..... enzymes. Some medicinal drugs reduce enzyme activity. These drugs are called enzyme ..... .

..... [5]

- (c) Enzyme cofactors are often derived from vitamins and minerals in the diet.

We need large amounts of protein in our diet, but we only need small amounts of vitamins and minerals.

Suggest why.

.....

.....

..... [1]

[Total: 11]

Question 4 begins on page 12

- 4 (a) Lipids form an important part of a balanced diet but if a person has too many lipids in their diet, the result may be obesity.

What is meant by the term *balanced diet*?

.....

.....

.....

..... [2]

- (b) (i) Lipids are used for energy storage and as a respiratory substrate.

List **three** other roles of lipids in the human body.

1 .....

.....

2 .....

.....

3 .....

..... [3]

- (ii) Other than obesity, outline why a diet high in lipids might have a harmful effect on a person's health.

.....

.....

.....

.....

.....

.....

..... [3]

- (c) Triglycerides and phospholipids are two examples of lipid molecules.

Identify **two** differences and **two** similarities in the **structures** of triglycerides and phospholipids.

Write your answers in the correct boxes in the table.

	Triglyceride	Phospholipid
Difference		
Difference		
Similarity		
Similarity		

[4]

- (d) It is possible to test for the presence of lipids in a food sample.

- (i) Name the test used to identify the presence of lipids.

..... [1]

- (ii) Describe how you would do this test on a food sample.

.....  
 .....  
 .....  
 .....  
 .....  
 .....  
 ..... [3]

- (iii) State the expected result if lipid is present in the food sample.

.....  
 ..... [1]

[Total: 17]

- 5 Scientists have identified about 1.8 million different species. The actual number of species that exist is likely to be a lot higher than 1.8 million.

(a) Suggest **two** reasons why the number of species identified is likely to be lower than the actual number of species present on Earth.

- 1 .....
- .....
- 2 .....
- .....

[2]

(b) Many organisations, such as the International Union for the Conservation of Nature (IUCN), collect annual data about the number of species known to exist and the extent to which these species are thought to be threatened.

Fig. 5.1 shows the total number of species assessed by the IUCN over a 10 year period. It also shows the number of these species that are considered to be threatened with extinction.

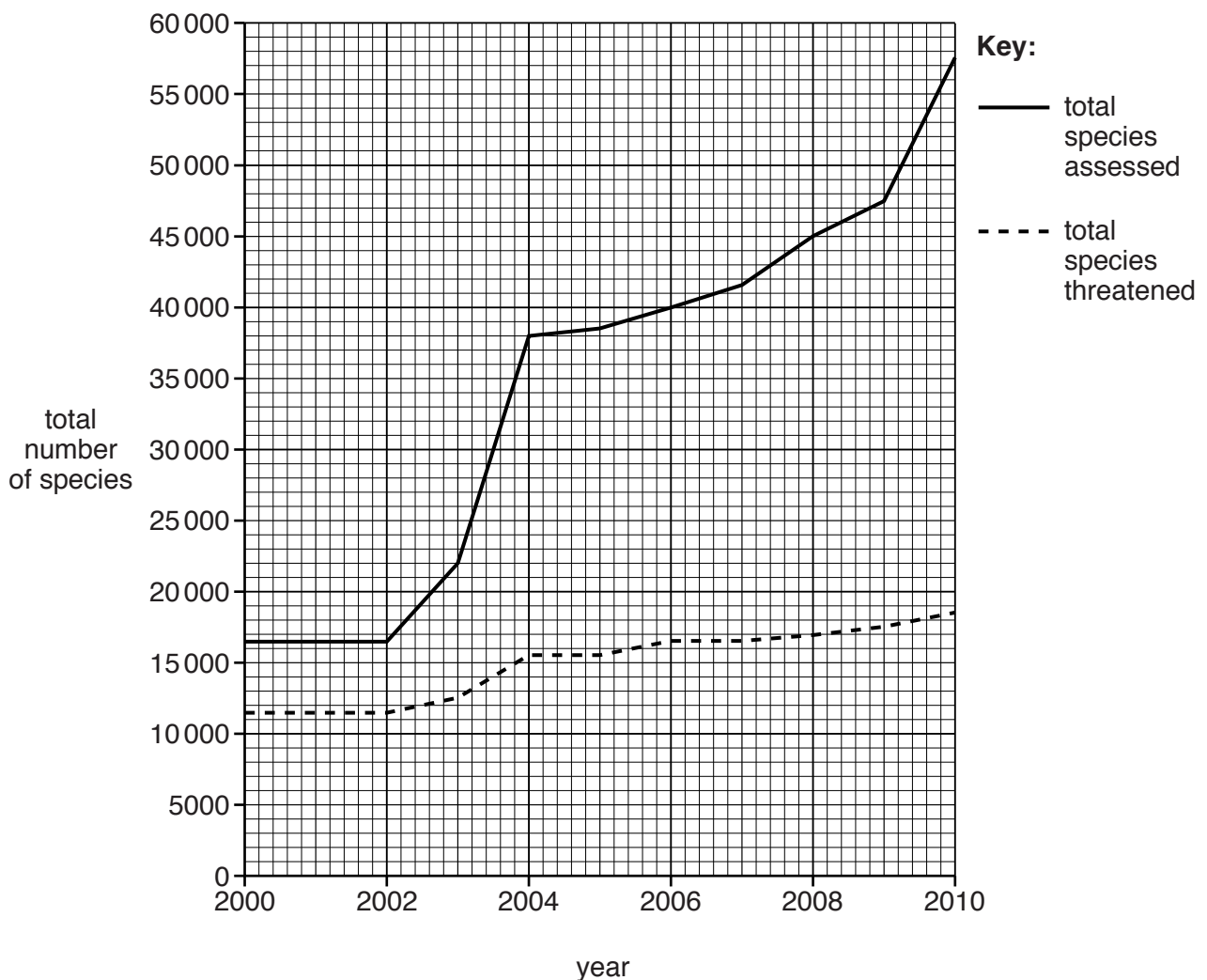


Fig. 5.1

- (i) Using Fig. 5.1, **compare** the changes in the total number of species assessed with the changes in the total number of threatened species over the 10 year period.

..... [3]

- (ii) Using Fig. 5.1, calculate the percentage of species assessed that were threatened with extinction in **2010**.

Show your working. Give your answer to the **nearest whole number**.

Answer = ..... % [2]

- (iii) Suggest explanations for the shape of the two curves between **2005** and **2010**.

..... [2]

- (c) A study of the biodiversity of an area considers the total number of species and also the relative number of individuals within each species.

State **one** further factor that could be taken into account when describing the biodiversity of an area.

.....  
 ..... [1]

- (d) In any attempt to protect global biodiversity, cooperation between countries is important.

Two examples of such international cooperation are:

- Convention on International Trade in Endangered Species (CITES)
- Rio Convention on Biological Diversity.

These two conventions try to protect biodiversity. State **two** other aims for each of these conventions.

Convention on International Trade in Endangered Species .....

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

Rio Convention on Biological Diversity .....

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

[4]

[Total: 14]



**17**  
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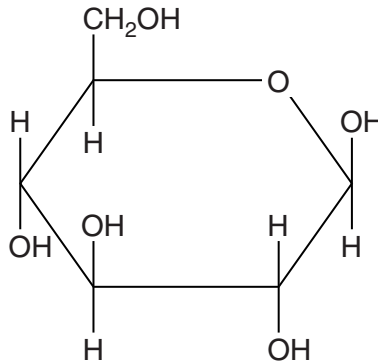
**Question 6 begins on page 18**  
**PLEASE DO NOT WRITE ON THIS PAGE**

- 6 (a) Glucose is a hexose sugar. Glucose is a monomer in many carbohydrates.

Name the precise group of carbohydrate molecules that glucose is an example of.

..... [1]

- (b) Fig. 6.1 represents the structure of a  **$\beta$ -glucose** molecule.



**Fig. 6.1**

- (i) Use Fig. 6.1 to draw a similar representation of an  **$\alpha$ -glucose** molecule in the space below.

[2]

- (ii) The cells of living organisms need glucose.

State and explain **two** of the ways that the glucose molecule is well suited to its function in living organisms.

.....  
 .....  
 .....  
 ..... [2]

- (c) Deoxyribose is a pentose sugar that is a component of the double-stranded DNA molecule.

Describe the structural relationship between deoxyribose and the other components of the DNA molecule.

.....

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.....

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..... [3]

- (d) Cellulose is a carbohydrate.

A student described the structure of cellulose as follows:

The cellulose molecule is insoluble.  
 It contains only the elements carbon, hydrogen and oxygen.  
 It is made up of  $\alpha$ -glucose subunits.  
 The glucose subunits are linked by 1-4 glycosidic bonds formed by hydrolysis reactions.  
 It also has some 1-6 glycosidic bonds.  
 It is made of many long chains.  
 The chains have branches.

- (i) Identify **three** mistakes the student made when describing the structure of cellulose.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

- (ii) Suggest the name of a molecule that closely matches the student's description.

..... [1]

[Total: 12]

- 7 (a)** Humans have been using microorganisms to make food for over 4000 years.

Yoghurt is a dairy product produced by the action of microorganisms on milk.

Suggest why a good supply of plants is needed for yoghurt production.

..... [1]

- (b)** Protein known as mycoprotein is said to be a healthy alternative to meat.

Mycoprotein is made using fungal microorganisms.

Discuss the advantages **and** disadvantages of using microorganisms to produce protein for people to eat.



*In your answer you should consider a range of advantages and disadvantages.*

[illegible]

.....

.....

.....

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.....

..... [8]

- (c) Microorganisms can also cause food to spoil. To prevent food spoiling, a range of food preservation methods are used.

Complete the table below to explain how each of the **three** methods of food preservation reduces the spoiling of food.

Method	Explanation
Freezing	
Pickling	
Irradiation	

[3]

[Total: 12]

Question 8 begins on page 22

- 8 The table below shows some biological terms and descriptions used in topics on evolution, biodiversity and conservation.

Complete the table using the most appropriate terms or descriptions.

The first one has been done for you.

Biological Term	Description
Natural Selection	The theory proposed by Darwin on the evolution of species.
Speciation	
	Differences between individuals covering a range of values instead of discrete categories.
Adaptation	
	A system of naming organisms that uses two scientific (Latin) names for species.
	The type of conservation that seed banks are an example of.
	A study carried out by a local planning authority in order to judge the effect of a development on the biodiversity of an area.

[6]

[Total: 6]

**END OF QUESTION PAPER**

This image shows a blank sheet of white paper designed for writing. It features a series of evenly spaced horizontal blue lines across its entire width. A single vertical red line runs down the left side, creating a narrow margin. The paper is otherwise completely empty, with no text or markings.

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