OCR
RECOGNISING ACHIEVEMENT

SPECIMEN F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE **A163/01**

BIOLOGY A

Unit A163: Module B7 (Foundation Tier)

Candidates answer on the question paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:
- Pencil
- Ruler (cm/mm)

Duration: 1 hour

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES
- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks for each question is given in brackets **[ ]** at the end of the question or part question.
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

For Examiner's Use		
	Max	**Mark**
1	**7**	
2	**12**	
3	**10**	
4	**7**	
5	**8**	
6	**1**	
7	**8**	
8	**7**	
TOTAL	**60**	

Answer **all** the questions.

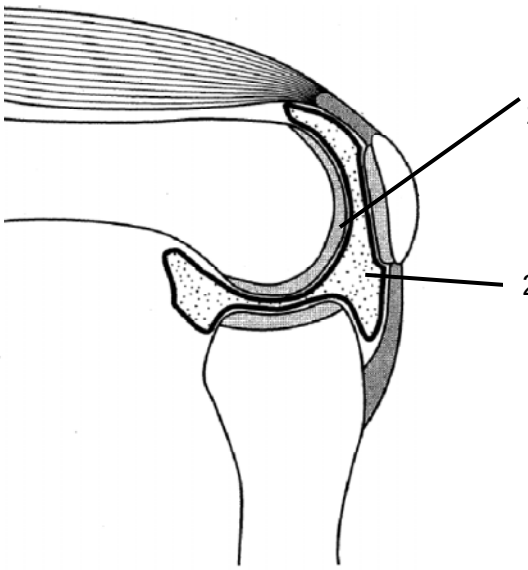
1 Vertebrates have an internal skeleton for support and movement.

(a) Bones are held together at joints.

(i) Complete the labelling of the diagram of a joint.

Choose from the following words.

bone **cartilage** **ligament** **synovial fluid** **tendon**



[1]

(ii) Each of these structures can be damaged.

Suggest what effect each of the following would have on the **functioning** of the joint.

structure 1 becomes worn away .....

.....

structure 2 increases in volume.....

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

(b) Taking part in athletics can be beneficial but risky.

Read the views of these people and then answer the following questions.

(i) Which person is talking about a benefit to themselves without considering the risks?

answer ..... **[1]**

(ii) Which **two** people are talking about a risk to themselves?

answers ..... and ..... **[1]**

(iii) Which person is talking about neither a benefit nor a risk to themselves?

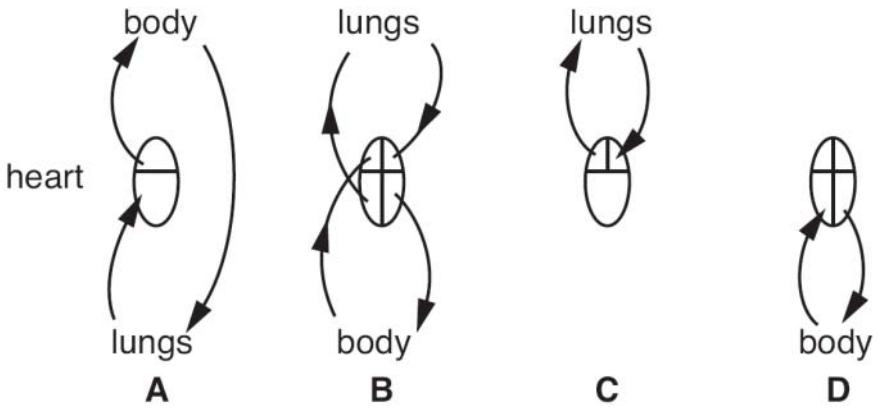
answer ..... **[1]**

(iv) Which person is talking about the benefits and risks to themselves?

answer ..... **[1]**

[Total: 7]

2 Mammals have a double circulatory system.



(a) Which diagram, **A**, **B**, **C** or **D**, shows a double circulatory system?

Write down the letter of the correct diagram and explain why you have chosen this diagram.

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

(b) The heart is a muscular pump.

Describe the role of the coronary artery.

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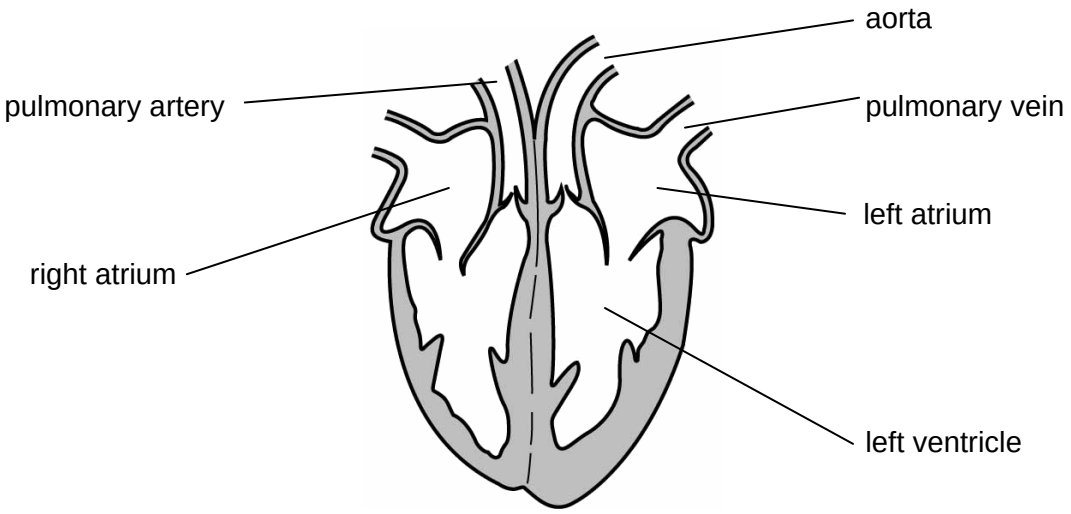
..... **[2]**

(c) Look at the diagram of the heart.

Some structures have been labelled.



Describe how blood flows through the heart, starting and finishing with the right atrium.

In your answer you should:

- use the names of the structures that are involved – some are labelled in the diagram
- make the order of events clear.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

(d) Suggest why the walls of the left ventricle have thicker muscles than the walls of the left atrium.

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

[Total: 12]

3 This question is about diabetes.

(a) Draw a straight line linking each **cause** of the condition to the **type of diabetes**. Then draw another straight line linking each **type of diabetes** to the way in which people with the condition can help to **control** it.

cause	type of diabetes	control
usually caused when the body no longer responds to its own insulin	**type1**	usually controlled by insulin injections
usually caused when the pancreas stops producing enough insulin	**type 2**	usually controlled by diet and exercise

[1]

(b) Some people with diabetes can help to manage their condition by eating food that is high in fibre and complex carbohydrates.

Explain how this can help to control their diabetes.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

(c) Read the article about diabetes.

The article was written by a doctor for his local newspaper.

Each line of the article has been numbered.

Diet and diabetes

1 The number of cases of diabetes is increasing.

2 We need to persuade people to have a better lifestyle.

3 There is a direct correlation between being overweight and developing diabetes.

4 Some people think they can eat whatever they like and it will not affect their chances of developing diabetes.

5 If you develop diabetes you may need to have insulin injections every day.

6 If only the Government could insist that we all ate a low fat diet, we could reduce the risk of developing diabetes later in life to almost zero.

(i) Which **two** lines of the article are statements based on data?

lines ..... and ..... **[1]**

(ii) Which lines of the article are statements based on the doctor's opinions or values?

lines ..... **[2]**

[Total: 10]

4 This question is about closed loop ecosystems.

(a) Complete the following sentences.

Put a (ring) around the correct choice to complete each sentence.

A closed loop system **has waste / does not have waste**.

This is because the **products / reactants** from one part of the system

become / do not become the **products / reactants** for another part of the system.

[2]

(b) Write down one example of a closed loop system and describe examples of how the system is a closed loop.

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.....

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

(c) An oak tree produces many more seeds (acorns) than it needs to replace itself when it dies.

Use ideas about closed loop systems to suggest why this overproduction of acorns is not wasteful.

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

[Total: 7]

5 This question is about genetic modification.

(a) Explain how bacteria can be genetically modified to produce human insulin.

Suggest benefits of using human insulin rather than insulin extracted from animals.

The quality of written communication will be assessed in your answer to this question.

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..... **[6]**

(b) Plants can be genetically modified to have particular features. For example, wheat can be genetically modified to be resistant to weed killer.

Look at the statements about the implications of genetic modification of crops.

Some of the statements relate to economic considerations, some of the statements relate to social considerations, and some of the statements relate to ethical considerations.

A It is morally wrong to alter the DNA of living things.

B Farmers may make more profit from their crops.

C Local communities should be able to decide if genetically modified organisms should be released into the environment.

D People can buy a bigger range of fruit and vegetables all year round.

E Because the crops produce bigger yields, the food can be sold more cheaply in the shops.

F Some people believe it is wrong to tamper with nature.

For each statement, identify whether it is an **economic** consideration, a **social** consideration or an **ethical** consideration.

Put each letter, **A**, **B**, **C**, **D**, **E** and **F**, in the correct column of the table.

economic	social	ethical

[2]

[Total: 8]

6 Nanotechnology is now being used in the food industry.

We need to make decisions about the risk of using nanotechnology in food.

Which two of the following should we use to assess the size of the risk?

Put ticks (✓) in the boxes next to the **two** correct answers.

the chance of a problem occurring	☐
the benefits of using nanotechnology	☐
how much nanotechnology will cost	☐
how many people are in favour of using nanotechnology	☐
the consequences of a problem occurring	☐

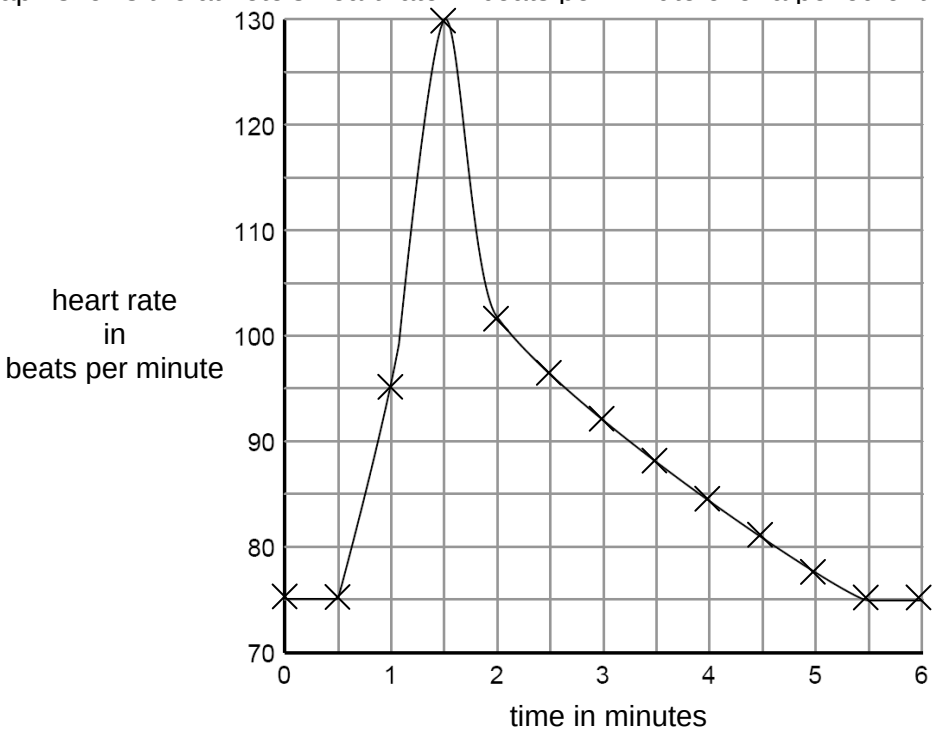
[1]

[Total: 1]

7 The heart rate of an athlete is measured during a training session.

A reading is taken once every 30 seconds.

The graph shows the athlete's heart rate in beats per minute over a period of time.



(a) Write down the athlete's resting heart rate in beats per minute.

answer ..... beats per minute **[1]**

(b) Express as a simple ratio the maximum heart rate compared to the resting heart rate.

answer ..... **[1]**

(c) **(i)** Write an **S** at the point on the time axis when the athlete **started** exercising.

Write an **F** at the point on the time axis when the athlete **finished** exercising. **[1]**

(ii) How long after stopping exercising did it take for the heart rate to return to normal?

answer..... min **[1]**

(d) Examine the graph carefully.

Explain why the graph does not fully display the heart rate of the athlete.

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

(e) Suggest how the data collected in parts **(a)**, **(b)** and **(c)** would be useful to the athlete in assessing his progress over several months of training.

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

[Total: 8]

8 Jake is concerned about his weight.

(a) He is 200 cm tall and has a body mass of 76 kg.

Use this formula to calculate Jake's body mass index (BMI).

Show your working.

$$\text{BMI} = \frac{\text{mass (kg)}}{[\text{height (m)}]^2}$$

BMI = ... **[2]**

(b) Look at the body mass index (BMI) table.

BMI	condition
less than 19	underweight
19 – 24	normal weight
25 – 29	overweight
30 – 40	obese
over 40	severely obese

Discuss whether Jake should be concerned about his body mass.

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

(c) Suggest reasons why the BMI table may not be an accurate way of evaluating whether a person is over or underweight.

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[3]

[Total: 7]

[Paper Total: 60]

END OF QUESTION PAPER

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