OCR
Oxford Cambridge and RSA

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Monday 19 June 2017 – Morning

GCSE TWENTY FIRST CENTURY SCIENCE BIOLOGY A/FURTHER ADDITIONAL SCIENCE A

A163/01 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

* A 1 6 3 0 1 *

* 6 8 6 5 0 2 6 7 0 6 *

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. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with a pencil ( ).
- 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 **60**.
- This document consists of **16** pages. Any blank pages are indicated.

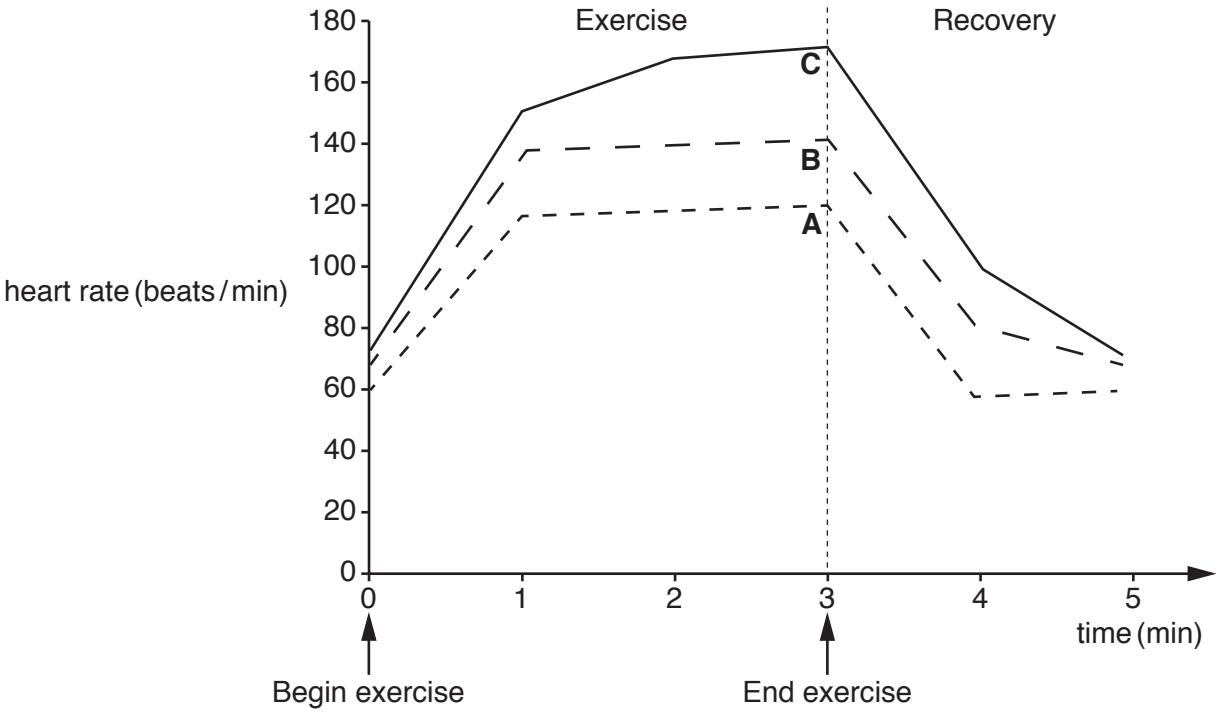
Answer **all** the questions.

1 Mick is investigating the effect of exercise on heart rate.

He asks three people to do an exercise test.

He measures their heart rate before, during and after exercise.

(a) The graph shows the change in their heart rate during and after the exercise.



(i) How long did the participants exercise for?

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

(ii) During exercise how much did participant **A**'s heart rate increase by?

..... bpm **[1]**

(iii) Which person **A**, **B** or **C** is the fittest?

Give **two** reasons for your answer.

Fitter person .....

Reason 1 .....

Reason 2 .....

[2]

(b) Stephen is a runner. He feels very tired after running.

He visits his doctor.

The doctor asks Stephen questions about his medical and lifestyle history.

For each question put a tick (✓) in the correct box to show if the question is about his **medical** or **lifestyle** history.

Question	Medical history	Lifestyle history
Are you currently taking any medication?		
How much alcohol do you drink each week?		
Do you smoke?		
How far do you run each week?		
Has anyone in your family had heart disease?		

[2]

(c) The heart's pacemaker makes the heart muscle contract at the right rate.

Stephen has a faulty pacemaker.

Stephen has an artificial pacemaker fitted.

A doctor records Stephen's heart rate before and after his artificial pacemaker is fitted. The doctor does this 4 times.

The results are shown in the table below.

	Heart rate readings (bpm)					
	1	**2**	**3**	**4**	**Mean**	**Range**
Before fitting artificial pacemaker	28	40	34	38	.....	..... to .....
After fitting artificial pacemaker	65	66	67	66	66	65 to 67

(i) Calculate Stephen's mean heart rate before the artificial pacemaker was fitted.

mean heart rate = ... **[2]**

(ii) Write down the range of Stephen's heart rate before his artificial pacemaker was fitted.

range = ... to ..... **[1]**

(iii) Describe how the artificial pacemaker changed Stephen's heart rate.

.....

.....

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

(iv) Stephen needed a small operation to fit his artificial pacemaker.

Suggest a risk from the operation.

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

(v) If needed, artificial heart valves can also be fitted.

Artificial valves are engineered.

Suggest **two** properties that the engineered valves should have.

1 .....

.....

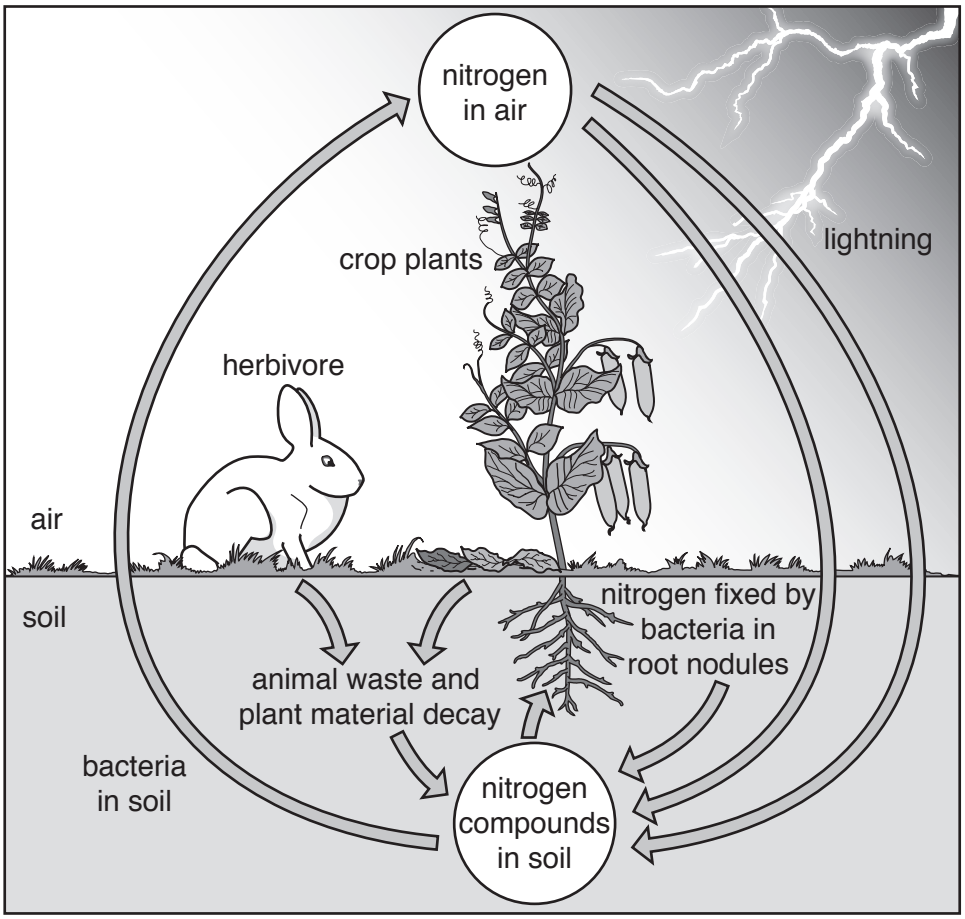
2 .....

.....

[2]

[Total: 14]

2 The diagram shows a natural nitrogen cycle.



(a) The diagram shows a perfect closed loop system.

In a closed loop system there is no waste, as the waste is recycled.

Use the diagram to describe an example of waste being recycled.

.....

.....

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

(b) The system in the diagram may not be a perfect closed loop system.

Which of the statements explain why?

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

Bacteria in the soil break down nitrogen compounds.	☐
Nitrogen compounds may enter a river and be washed away.	☐
The rabbit may die.	☐
The crop plant may be harvested and removed.	☐
The rabbit may migrate.	☐
There may be no lightning.	☐

[3]

(c) Rainforests are stable ecosystems.

(i) Cutting down trees can cause an increase in soil erosion.

Suggest how cutting down trees causes this increase in soil erosion.

.....

.....

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

(ii) Cutting down trees can have other unintended effects.

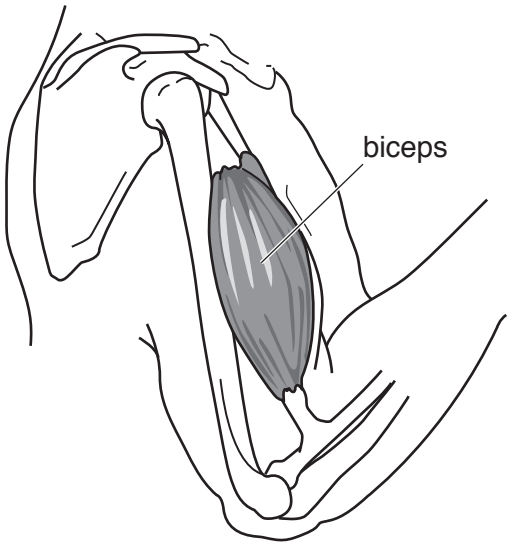
Put ticks (✓) in the boxes next to **two** possible unintended effects of cutting down trees.

Fewer clouds will form and there will be less rainfall.	☐
No new vegetation will grow to replace the harvested timber.	☐
Species diversity will increase.	☐
There will be an increase in oxygen released.	☐
Temperatures will increase in areas where timber is removed.	☐

[2]

[Total: 9]

3 A student draws a diagram to show how muscles move bones at the elbow joint.



(a) On the diagram draw and label:

(i) the antagonistic muscle to the bicep **[1]**

(ii) the tendons **[1]**

(b) Describe how muscles at a joint allow the joint to move.

.....

.....

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

(c) Sprains are common joint injuries.

Describe the symptoms of a sprain.

.....

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

(d) Joints are made of many different parts.

Draw a straight line to link each **part** to its **properties** and its **job**.

Part	Properties	Job
cartilage	bands of tough elastic tissue	transmits forces between muscle and bone
ligament	smooth shock-absorbing surface	reduces friction between bones
tendon	tough band of inelastic tissue	stabilises joints while allowing movement

[3]

[Total: 9]

4 Blood transports molecules around the body.

Write about the different components of the blood and the molecules they transport.

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

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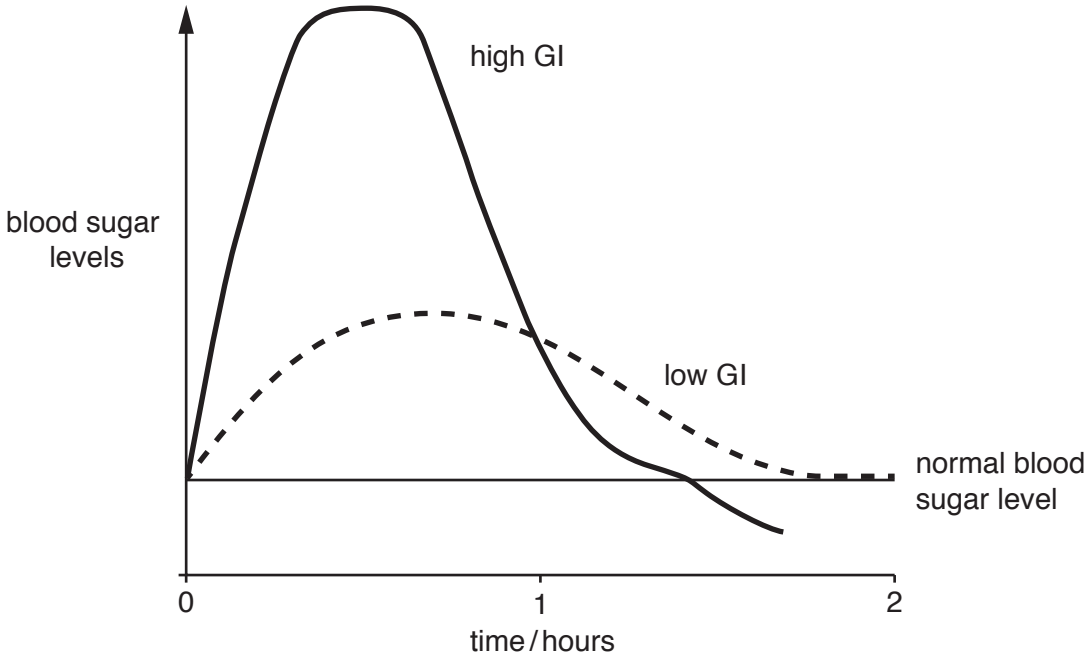
..... **[6]**

[Total: 6]

5 Glycaemic Index (GI) is a measure of how quickly a food raises blood sugar levels.

Food is given a GI value, this value is classed as high or low.

The graph shows the effect of high GI and low GI foods on blood sugar levels.



(a) Use the graph to complete the conclusions below.

Put a (ring) around the correct word(s) to complete each conclusion.

High GI foods cause blood sugar levels to stay **the same** / **rise quickly** / **rise slowly**.

High GI foods cause blood sugar levels to rise to a **higher** / **similar** / **lower** amount than Low GI foods.

After an hour and a half high GI foods cause blood sugar levels to **fall back to normal** / **fall below normal** / **stay above normal**.

[3]

A student reads an article that claims processed foods have a higher GI value than non-processed foods.

A GI value over 70 is considered high.

The GI values of five foods are shown in the table below.

Food	GI
broccoli	10
beetroot	64
doughnut	76
crisps	83
onions	75

(b) Does the data in the table **support** the idea that only processed foods have high GI values?

.....

.....

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

[Total: 5]

6 Asha is 15 years old and has recently been told that she has diabetes.

Her grandfather also has diabetes. He was told he had diabetes at the age of 68.

Asha is told that the treatment she will be given for her diabetes will be different to her grandfather.

Describe how Asha and her grandfather will control their diabetes and explain why their treatment will be different.

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

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

[Total: 6]

7 Polly runs a marathon.

(a) When Polly runs she sweats to cool down.

Explain how sweating helps Polly lose heat.

.....

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

(b) Polly doesn't drink enough during the race and her body overheats.

Put the statements **A**, **B**, **C** and **D** in the correct order to explain why Polly overheats.

One has been done for you.

A Polly dehydrates

B Polly's core body temperature rises

C running causes increased sweating

D sweating is reduced

	A		

[2]

[Total: 3]

8 Read the newspaper article.

Paralysed man walks again after cell transplant

A man was attacked with a knife. His spinal cord was badly damaged leaving him unable to walk.

Cells from part of his nose were removed, grown in the lab and then injected into his spinal cord. Two years after the treatment the man was able to walk again.

Similar cell transplants have been used to treat leukaemia for many years.

Describe how cell transplants can be used to treat spinal cord injuries and leukaemia. Identify the type of cells used in these treatments.

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

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

[Total: 6]

9 Nanoparticles are used in the food industry.

They can be added to the plastic packaging used to seal food in containers.

They change colour when the amount of oxygen in the packet increases.

Suggest why this may be useful.

.....

.....

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

[Total: 2]

END OF QUESTION PAPER