

Monday 20 June 2016 – Morning

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

A163/01 Module B7 (Foundation Tier)

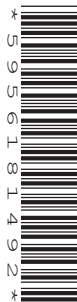
Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: 1 hour



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 page(s) 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 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.

2

Answer **all** the questions.

1 Vertebrates such as humans have an internal skeleton.

(a) What is the job of an internal skeleton?

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

digestion

☐

nerve transmission

☐

support the body

☐

control of body temperature

☐

movement

☐

[2]

(b) The skeleton has joints.

Different parts of joints do different jobs, so need different properties.

Draw straight lines to join each **part** to its correct **job**.

Then draw straight lines to join each **job** to the **property** needed.

Part	Job	Property
cartilage	transmits forces between muscle and bone	elastic
tendon	holds joints together	tough
ligament	reduces friction	smooth

[3]

(c) Excessive exercise can cause injury to joints.

Write down the names of **three** types of injury that can happen to a joint.

1

2

3

[2]

3

(d) Injury to a joint may be treated by a physiotherapist.

Describe the role of a physiotherapist in the treatment of a skeletal-muscular injury.

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..... [3]

[Total: 10]

4

2 Neil is worried that he might have too much body fat and be overweight.

Here are some facts about Neil:

- his age is 43
- his body fat is 29%
- his mass is 90 kg
- his height is 1.7 m

Look at the formula, table and body fat chart below.

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

BMI	Category
<19	underweight
19 – 24	healthy weight
25 – 29	overweight
30 – 40	obese
>40	very obese

BODY FAT % MEASUREMENT CHART FOR MEN

AGE ↑ ↓	18–20	2.0	3.9	6.2	8.5	10.5	12.5	14.3	16.0	17.5	18.9	20.2	21.3	22.3	23.1	23.8	24.3	24.9
	21–25	2.5	4.9	7.3	9.5	11.6	13.6	15.4	17.0	18.6	20.0	21.3	22.3	23.3	24.2	24.9	25.4	25.8
	26–30	3.5	6.0	8.4	10.6	12.7	14.6	16.4	18.1	19.6	21.0	22.3	23.4	24.4	25.2	25.9	26.5	26.9
	31–35	4.5	7.1	9.4	11.7	13.7	15.7	17.5	19.2	20.7	22.1	23.4	24.5	25.5	26.3	27.0	27.5	28.0
	36–40	5.6	8.1	10.5	12.7	14.8	16.8	18.6	20.2	21.8	23.2	24.4	25.6	26.5	27.4	28.1	28.6	29.0
	41–45	6.7	9.2	11.5	13.8	15.9	17.8	19.6	21.3	22.8	24.7	25.5	26.6	27.6	28.4	29.1	29.7	30.1
	46–50	7.7	10.2	12.6	14.8	16.9	18.9	20.7	22.4	23.9	25.3	26.6	27.7	28.7	29.5	30.2	30.7	31.2
	51–55	8.8	11.3	13.7	15.9	18.0	20.0	21.8	23.4	25.0	26.4	27.6	28.7	29.7	30.6	31.2	31.8	32.2
	>55	9.9	12.4	14.7	17.0	19.1	21.0	22.8	24.5	26.0	27.4	28.7	29.8	30.8	31.6	32.3	32.9	33.3
		Lean				Ideal				Average				Above average				

Should Neil be worried?

Use the information on the opposite page to **explain** your conclusion and suggest what action Neil should take.



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

..... [6]

[Total: 6]

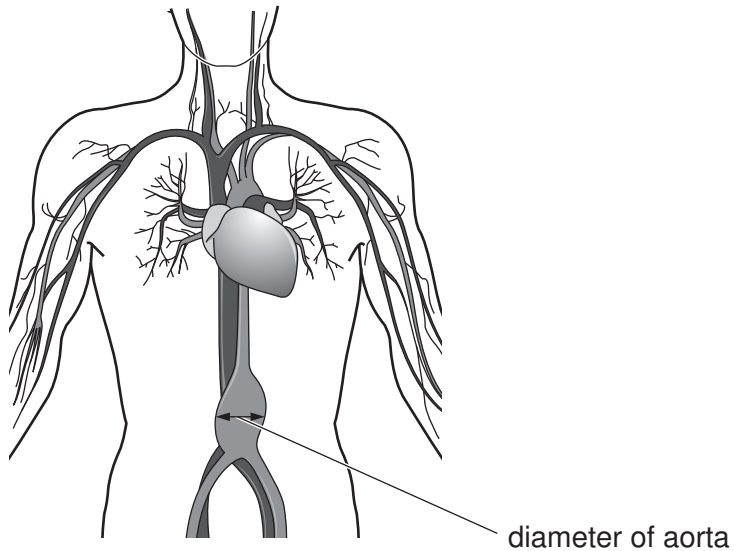
6

3 Swelling of the aorta is dangerous.

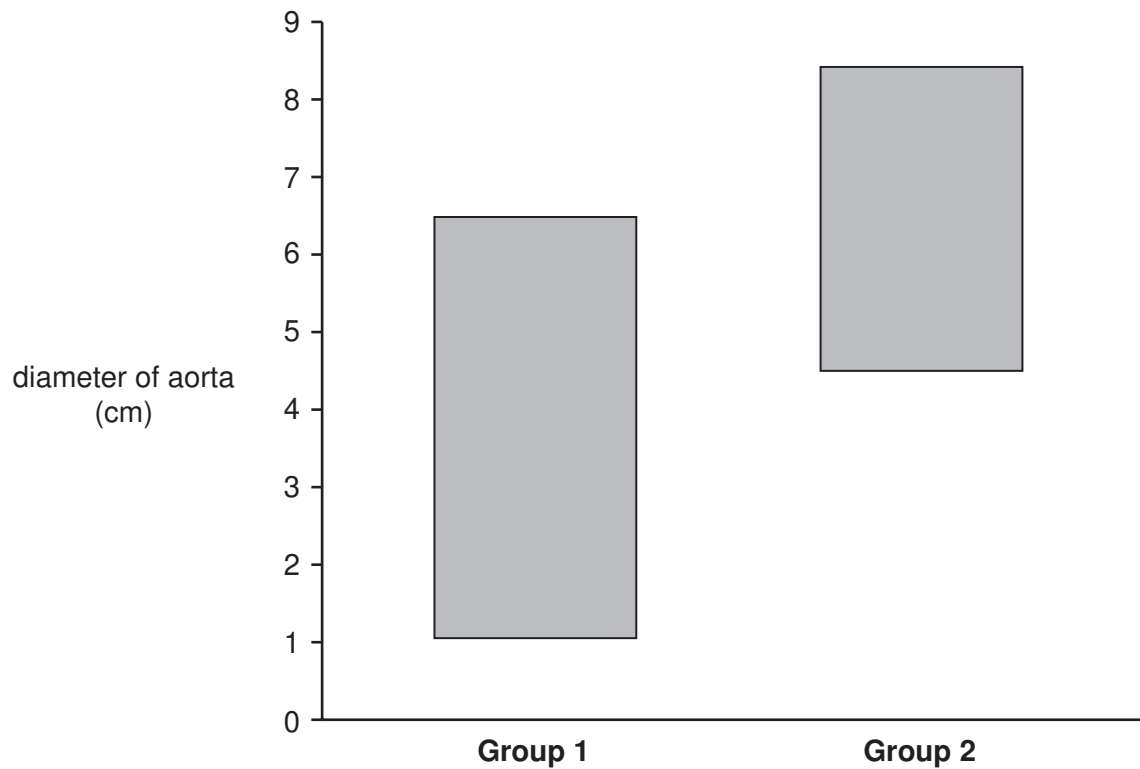
The swelling is called an aneurysm.
A swollen aorta can burst and usually results in death.

Men are screened to detect a dangerous swelling of the aorta.

The diameter of a healthy aorta is approximately 2 cm.



The diameter of the aorta was measured in two groups of men aged over 65.
The range of diameters of the aorta is shown in the graph for both groups.



7

- (a) It was decided to give the men in **Group 2** surgery to repair the aneurysm. Men in **Group 1** were not given surgery.

Look at the diagram and graph on the opposite page.

Discuss the decision to give surgery to the men in **Group 2** but not to the men in **Group 1**. Use the data to support your answer.



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

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..... [6]

8

- (b) An aneurysm is repaired, during surgery, by inserting a plastic tube called a stent into the aorta.

A stent is an example of biomedical engineering.

- (i) Write down **two** other examples of biomedical engineering used in treating heart disease.

1

2

[2]

- (ii) Suggest **three** risks to the patient of repairing an aneurysm during surgery.

1

2

3

[3]

- (iii) Suggest ways of reducing the risks to the patient.

.....

.....

..... [2]

[Total: 13]

9

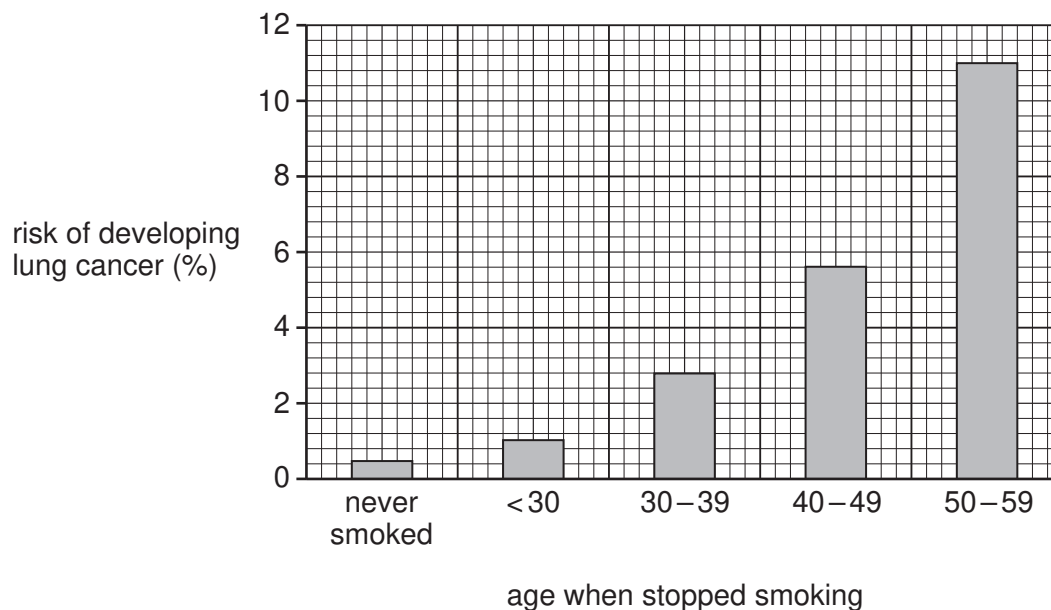
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10

- 4 Smoking cigarettes increases the risk of developing lung cancer. This risk can be reduced by stopping smoking.

The graph shows the risk of developing lung cancer in people who have never smoked and people who have stopped smoking.



- (a) Look at the graph.

- (i) What does the number <30 on the horizontal axis mean?

.....
 [2]

- (ii) Steve was 45 years old when he stopped smoking.

Write down his increase of percentage risk of developing lung cancer if he had waited until he was 55 years old.

increase of percentage risk = % [2]

- (iii) Write down **two** different conclusions that can be made from looking at the graph.

.....

 [2]

11

- (iv) The graph does not show the age at which people started smoking.

Suggest why this information is important when making conclusions from the graph.

.....

.....

..... [2]

- (b) Smoking is an example of an unhealthy lifestyle choice.

Write down **two** other examples of an unhealthy lifestyle choice.

Explain why each lifestyle choice may cause health problems.

Lifestyle choice 1

.....

Lifestyle choice 2

..... [2]

[Total: 10]

5 Rainforests are an important ecosystem.

- (a)** Rainforests obtain their energy from sunlight.

Explain why scientists regard sunlight as a sustainable source of energy.

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

- (b)** Rainforests used to be thought of as closed-loop systems.
Now, large amounts of biomass are removed when timber is harvested.

Explain the effects that the removal of timber has on the closed-loop system.

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

- (c)** Burning is another way that biomass is removed from a rainforest.
Rainforests are burnt to create grassland to keep cattle.

Write down **two** groups of people who might be affected by this action.

Identify the advantage **or** disadvantage to each group.

Group 1

.....

Group 2

.....

[2]

[Total: 6]

13

- 6 Maintaining a constant body temperature is important.
Sweating is one method that our body uses to maintain a constant temperature.

- (a) Complete these sentences to show the response of the body if body temperature gets **too high**.

If the body temperature gets **too high** the amount of sweat produced will

.....

This causes the body temperature to

[2]

- (b) Sunita runs a marathon.
The weather is very hot.
She does not drink enough water during the race.

What effect could this have on Sunita's body temperature? Explain your answer.

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..... [2]

- (c) Sunita's body temperature is controlled by receptors, effectors and a processing centre.

Draw straight lines to join each **structure** to its correct **description**.

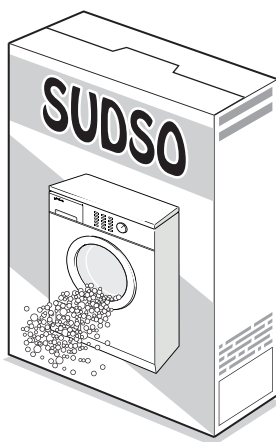
structure	description
temperature detector in skin	effector
brain	processing centre
sweat gland	receptor

[2]

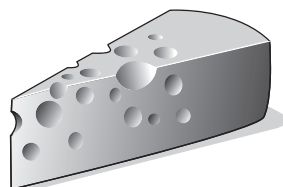
[Total: 6]

7 Bacteria and fungi can be grown on a large scale in fermenters.

- (a) Bacteria and fungi make substances that are used in biological washing powders and in the manufacture of vegetarian cheese.



biological washing
powder



vegetarian cheese

- (i) What do **biological** washing powders contain that is made by bacteria and fungi?

..... [1]

- (ii) Explain why this cheese can be eaten by **vegetarians**.

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

15

- (b) The table below shows the approximate number of bacteria in a fermenter over a period of time.

Time (minutes)	Number of bacteria
0	1000
20	2000
40	4000
60	8000
80	16 000
100	32 000
120	64 000

Describe the features of bacteria that make them suitable for producing useful products and explain how they can be made to do this on a large scale.



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

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..... [6]

[Total: 9]

END OF QUESTION PAPER

