

Monday 16 June 2014 – Morning**GCSE TWENTY FIRST CENTURY SCIENCE
BIOLOGY A / FURTHER ADDITIONAL SCIENCE A****A163/02** Module B7 (Higher 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**MODIFIED LANGUAGE**

Candidate
forename

Candidate
surname

Centre number

Candidate number

INSTRUCTIONS TO CANDIDATES

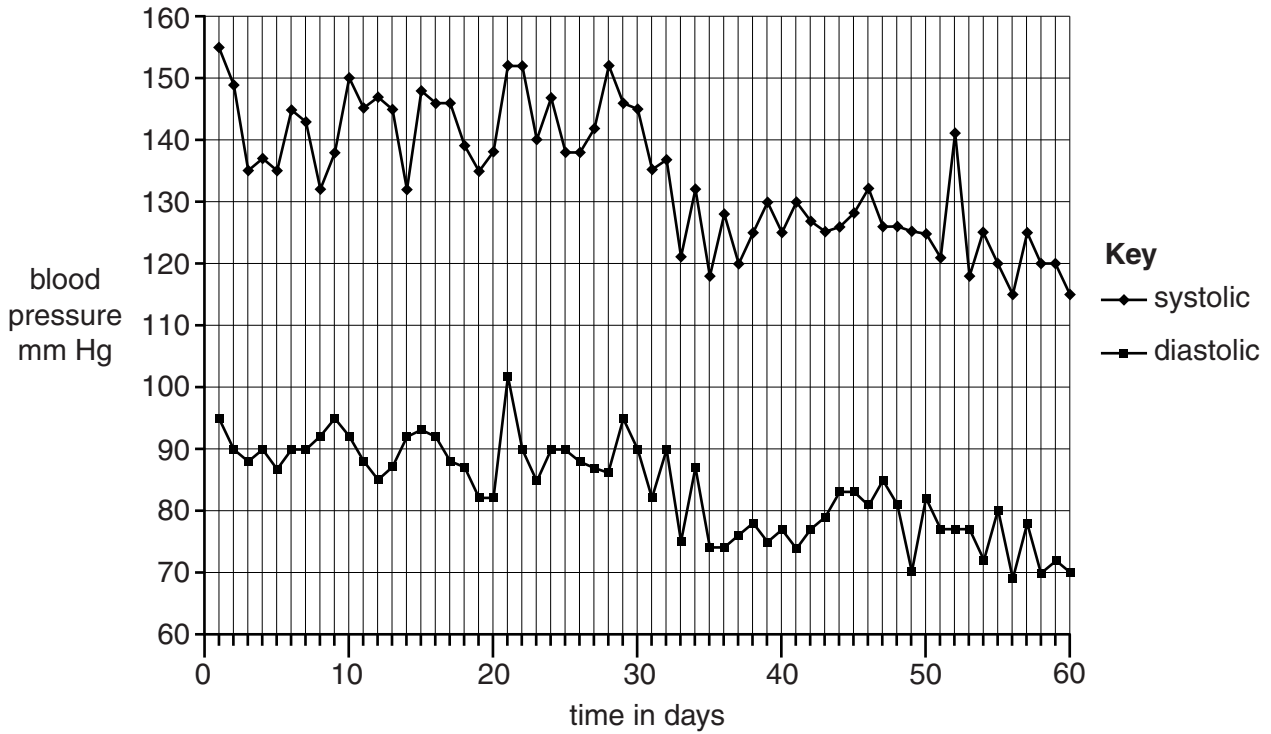
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. 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 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.

Answer **all** the questions.

- 1 Robert is worrying about his blood pressure.
 He decides to measure his blood pressure every day.
 Blood pressure consists of two readings.
 Systolic pressure is when the heart muscle is contracting.
 Diastolic pressure is when the heart muscle is relaxing.
 The graph shows Robert's blood pressure taken over sixty days.



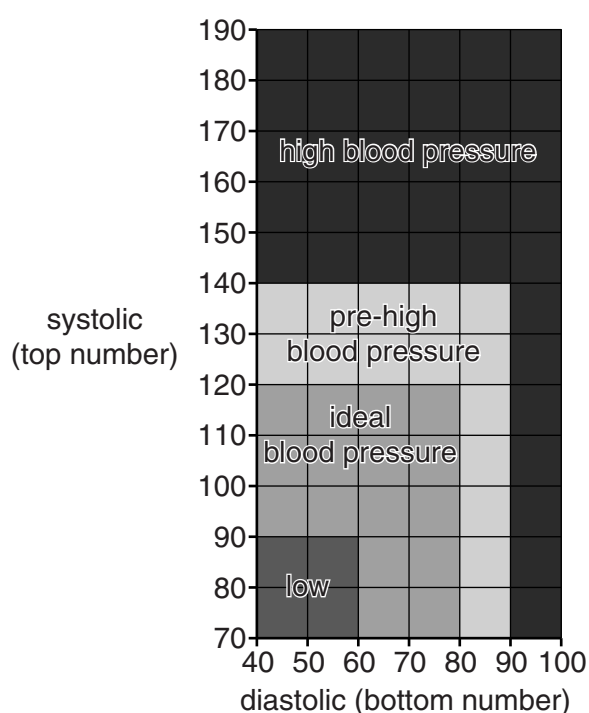
- (a) (i) Use the graph to find Robert's blood pressure readings **on day 1**.

systolic

diastolic

[1]

- (ii) Robert looks at a chart about blood pressure readings.



Use this chart and your answer to part (i) to describe Robert's blood pressure **on day 1**. Put a tick (✓) in the correct box.

	low	ideal	pre-high	high
Robert's blood pressure on day 1				

[1]

- (b) At one point during the sixty days, Robert's doctor gave him some medicine to reduce his blood pressure.

On which day do you think that Robert started to take his medicine?

day

[1]

- (c) Robert's blood pressure changes from day to day. Suggest one **other** reason why.

..... [1]

- (d) Robert's average systolic blood pressure for the first seven days was 142.7 mm Hg. The table shows his systolic blood pressure for the last seven days.

- (i) Complete the table by calculating Robert's average (mean) systolic blood pressure readings for the last seven days.

Day	Robert's systolic blood pressure in mm Hg
54	125
55	120
56	115
57	125
58	120
59	120
60	115
mean	

[2]

- (ii) Suggest why scientists often calculate the mean of a set of data.

.....
 [1]

- (iii) Write down the range of systolic readings of Robert's blood pressure during the last seven days.

from to

[1]

- (iv) Use the data to provide evidence that the medicine reduced Robert's blood pressure.

.....

 [2]

[Total: 10]

2 Humans live in parts of the world that have high and low temperatures.

- (a)** The human body can only work properly if the internal temperature of the body is kept constant.

Explain how the human body monitors and controls its temperature when it is exposed to high and low temperatures.



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

..... [6]

- (b)** A farmer has two glasshouses.

The first glasshouse has automatic heaters which switch off when the temperature goes above 22°C.

The second glasshouse has the same automatic heaters and also has windows that open when the temperature goes above 22°C.

Both glasshouses use the same type of control system.

What name is given to this type of control system? Why is the system better in the second glasshouse?

.....

.....

..... [2]

[Total: 8]

3 Tissue fluid is extremely important.

- (a)** Explain how tissue fluid is formed in capillary beds.

.....

.....

..... [2]

- (b)** Describe the functions of tissue fluid.
Include in your answer the name of the process involved.

.....

.....

.....

..... [3]

[Total: 5]

- 4** Organisms in an ecosystem are dependent on each other.
A farmer sprays a crop with an insecticide to kill insect pests.

Explain how insecticides can have harmful effects on other organisms in an ecosystem.



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

[6]

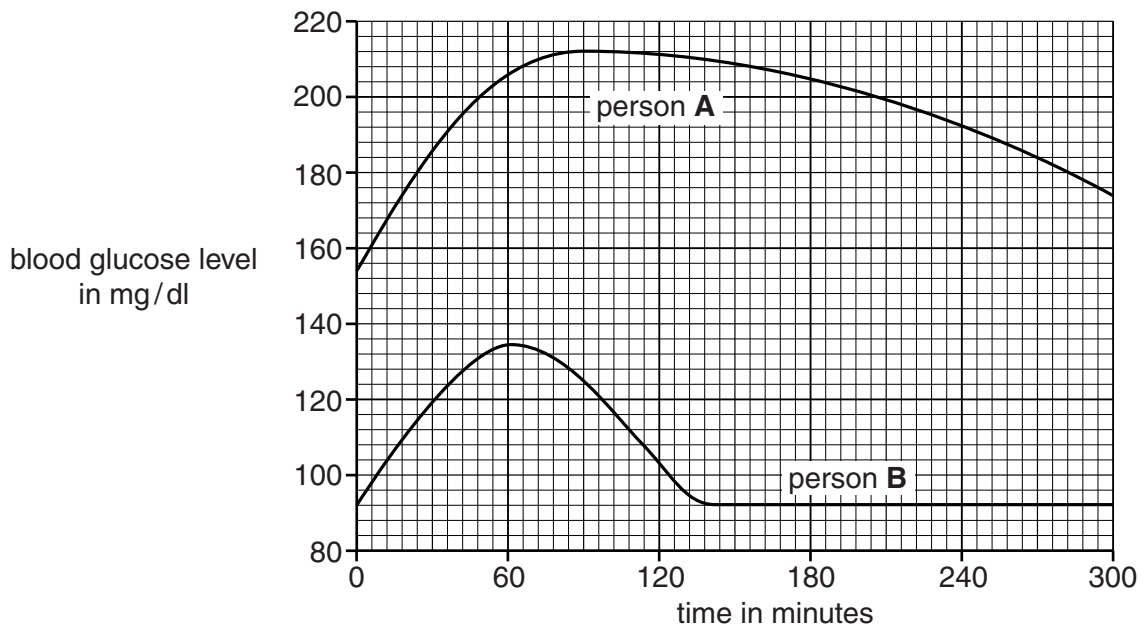
[Total: 6]

- 5 The Oral Glucose Tolerance Test (OGTT) measures how quickly glucose is removed from our blood after we swallow a glucose drink. The levels of blood glucose are measured using blood samples taken over a period of time.

The stages in this test are:

1. Do not eat or drink for eight hours.
2. Give a blood sample.
3. Drink a glucose drink.
4. Give blood samples over the next few hours.

The graph shows the results of this test on two different people.



- (a) (i) After how many minutes did person **A** reach a maximum blood glucose level?

person **A** minutes

- (ii) After how many minutes did person **B** reach a maximum blood glucose level?

person **B** minutes

[1]

- (b) Use the graph to describe **three** other ways that the blood glucose level of person **A** is different from the blood glucose level of person **B**.

.....

.....

.....

..... [3]

- (c) What conclusions can you make about the health of person **A** and person **B**?

Explain your answer.

.....

.....

.....

.....

..... [3]

- (d) A doctor observed an OGTT graph of another patient. The doctor predicted that the patient was healthy. Further tests proved this patient was healthy.

Explain what it means to a scientist when an observation agrees with a prediction.

.....

.....

..... [2]

[Total: 9]

A black and white cartoon illustration of a scuba diver underwater. The diver is wearing a mask, a regulator in their mouth, and a tank on their back. Bubbles are rising from the regulator. The diver is positioned horizontally, with their legs pointing towards the left. The background shows wavy lines representing water.

Air bubbles in the blood can block blood flow to organs. This causes pain and damage.

If the bottle is opened slowly, fewer bubbles appear in the drink.



..... [6]

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11
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Question 7 begins on page 12.
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- 7 Neil investigates whether using fertiliser increases seed production in plants.

He grows five plants without fertiliser and five plants with fertiliser.

He counts the number of seeds each plant produces.

These are his results.

Each star (★) in the table represents one plant.

Number of seeds produced	Without fertiliser	With fertiliser
100	★	
110	★	
120		
130	★	★
140		★
150	★	★
160		★
170		★
180	★	
mean	134 seeds	150 seeds

Three students comment on Neil's results.

Wendy

You cannot say that plants with fertiliser produce more seeds because the ranges of the two groups of plants (those without fertiliser and those with fertiliser) overlap.

Alistair

Adding fertiliser is a waste of time because one plant without fertiliser produced the most seeds.

Ann

Adding fertiliser must make a difference because the plants with fertiliser have a higher mean.

- (a) For each student, state whether they are right or wrong. Comment on each student's statement.

Ann

.....

.....

Alistair

.....

.....

Wendy

.....

.....

[4]

- (b) Neil does his experiment in a glasshouse.
Suggest whether the experiment involved an open loop system or a closed loop system.
Give **two** reasons for your answer.

.....

.....

..... [2]

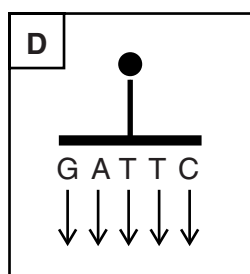
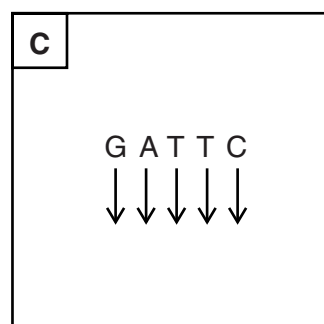
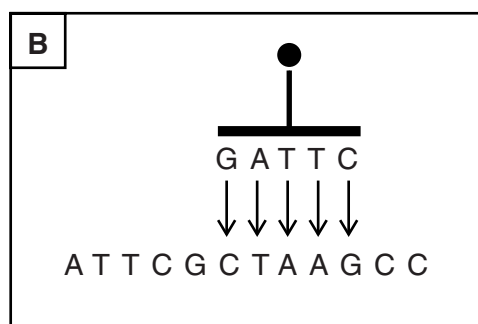
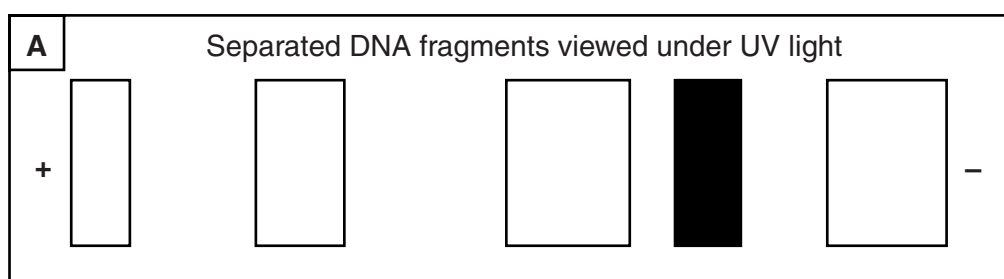
[Total: 6]

- 8 Genetic testing uses DNA technology.
Genetic testing can be used to find out if a person is a carrier for a genetic condition.

- (a) These are the stages in the process of genetic testing.
They are listed in the correct order.

1	Isolation of DNA sample from white blood cells.
2	Production of gene probe.
3	Gene probe labelled with UV fluorescent dye.
4	Addition of gene probe to DNA sample.
5	Use UV light to detect gene probe on DNA sample.

The diagrams below, **A**, **B**, **C**, **D** and **E**, show these stages but they are not in the correct order.



Put the diagrams, **A**, **B**, **C**, **D** and **E**, in the correct order.

.....

[4]

- (b) Suggest whether the DNA sample carried the allele for the genetic condition that was being looked for.
Explain your answer.

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

[Total: 5]

Question 9 begins on page 16.

9 This question is about using microorganisms for industrial processes.

- (a) Which of these features of bacteria make them ideal for using in industrial processes?
Put ticks (✓) in the boxes next to the **three** correct answers.

Bacteria need carefully controlled conditions for growth.

☐

Bacteria have a rapid rate of reproduction.

☐

Bacteria can make complex molecules.

☐

There are few ethical concerns over bacteria culture.

☐

Bacteria cannot be seen with the naked eye.

☐

Some of the bacteria can cause disease in other living organisms.

☐

Bacteria can cross-contaminate other industrial processes.

☐

[3]

- (b) Bacteria and fungi can be grown in large scale fermenters to make different products.
Put ticks (✓) in the boxes next to **three** of these products.

red blood cells

☐

single cell protein

☐

a replacement heart

☐

antibiotics

☐

a genetically modified wheat plant

☐

enzymes

☐

nerve cells

☐

[2]

[Total: 5]

END OF QUESTION PAPER



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