Write your name here

Surname	Other names

Pearson Edexcel
International
Advanced Level

Centre Number | | | | | |

Candidate Number | | | | |

Biology

Advanced Subsidiary
Unit 1: Lifestyle, Transport, Genes and Health

Thursday 21 May 2015 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
WBI01/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 4 8 6 9 A 0 1 2 0

PEARSON

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 (a) The release of thromboplastin starts the blood clotting process.

For each of the statements below, put a cross ☒ in the box next to the correct answer.

(i) Thromboplastin is released from

(1)

☒ **A** muscle cells

☒ **B** platelets

☒ **C** red blood cells

☒ **D** white blood cells

(ii) Thromboplastin is a

(1)

☒ **A** carbohydrate

☒ **B** lipid

☒ **C** nucleic acid

☒ **D** protein

(iii) Thromboplastin converts

(1)

☒ **A** fibrin into fibrinogen

☒ **B** fibrinogen into fibrin

☒ **C** prothrombin into thrombin

☒ **D** thrombin into prothrombin

(b) Heparin is a chemical that affects blood clotting time.

The table below shows the effect of heparin concentration on blood clotting time.

Heparin concentration / arbitrary units	Blood clotting time / seconds
0.0	30.1
0.5	30.1
1.0	29.6
1.5	28.8
2.0	27.3
3.0	39.4
4.0	186.8

(i) Using the information in the table, describe the effect of heparin concentration on blood clotting time.

(3)

(ii) Suggest why heparin, at higher concentrations, can be used to treat patients who are at risk of forming blood clots.

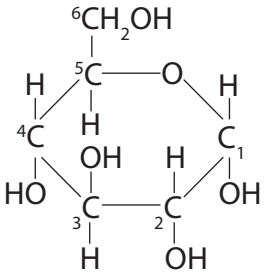
(1)

(iii) Suggest **one** risk of using heparin to treat these patients.

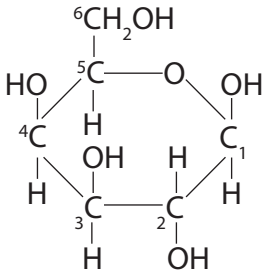
(1)

(Total for Question 1 = 8 marks)

2 The diagrams below show the structure of two carbohydrate molecules, α-glucose and galactose.



α-glucose



galactose

(a) Use the information in the diagrams to explain why these two molecules are classed as monosaccharides.

(2)

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(b) Use the information in the diagrams to give **two** differences between a molecule of α-glucose and a molecule of galactose.

(2)

1 .....

.....

.....

2 .....

.....

.....

(c) (i) Place a cross ☒ in the box next to the carbohydrate that is formed when a molecule of α-glucose and a molecule of galactose join together.

(1)

☒ **A** amylose

☒ **B** lactose

☒ **C** maltose

☒ **D** sucrose

(ii) Describe how these two monosaccharides join to form this carbohydrate.

(3)

(iii) An enzyme is involved in the formation of this carbohydrate. A different enzyme is involved in the formation of a carbohydrate made from two glucose molecules.

Explain why different enzymes are involved in the formation of these different carbohydrates.

(3)

(d) Give **two** differences between a monosaccharide and a polysaccharide.

(2)

1 .....

2 .....

(Total for Question 2 = 13 marks)

3 Ehlers-Danlos syndrome (EDS) is an inherited disorder caused by a mutation.

In EDS, the structure of collagen may be altered or less collagen is produced. Collagen is a fibrous protein.

(a) Describe the structure of a fibrous protein.

(3)

(b) Suggest how a mutation could cause the structure to be altered.

(3)

(c) One problem associated with EDS is a weakening of the structure of the arteries. This may cause arteries to rupture (burst).

Suggest why an alteration in the structure of collagen, or less collagen being produced, could cause arteries to rupture.

(3)

(d) One form of EDS is caused by a recessive allele.

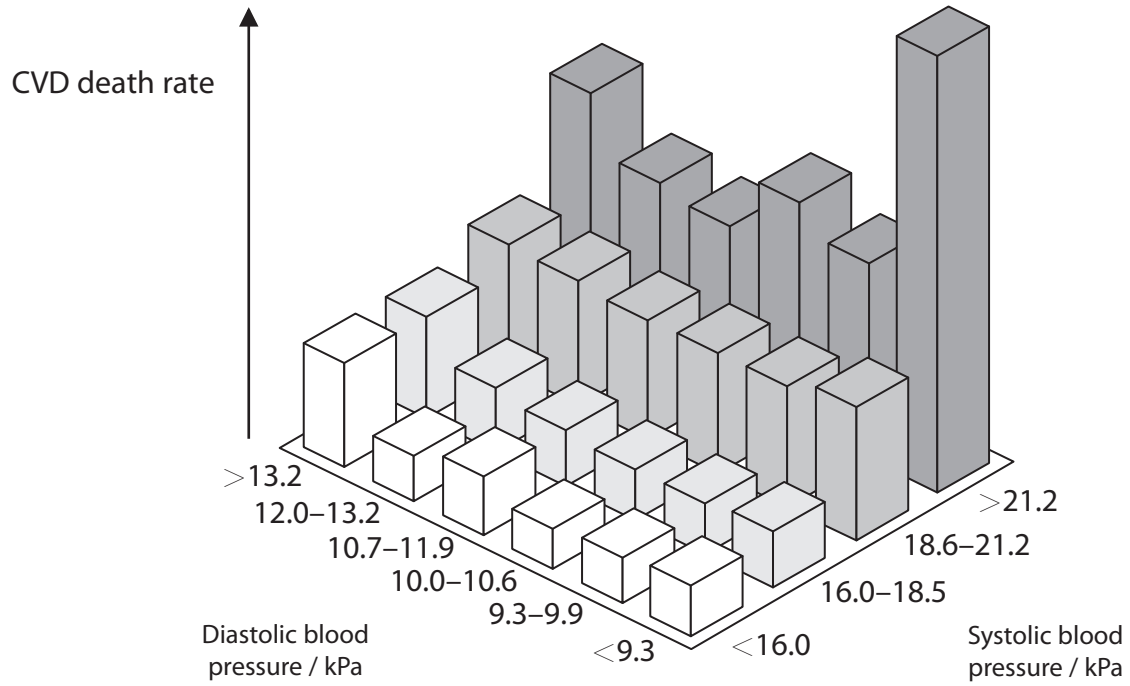
Explain how parents who are both heterozygous for this form of EDS could calculate the probability of having a child with the disorder.

(4)

(Total for Question 3 = 13 marks)

4 High blood pressure is a factor that increases the risk of cardiovascular disease (CVD).

The graph below shows the effects of diastolic blood pressure and systolic blood pressure on CVD death rate.



(a) Using the information in the graph, describe the effects of diastolic blood pressure and systolic blood pressure on CVD death rate.

(3)

(b) Explain why high blood pressure increases the risk of CVD.

(3)

(c) State **two** factors that increase blood pressure.

(2)

1 .....

2 .....

(d) Place a cross ☒ in the box next to the type of drug used to treat high blood pressure.

(1)

☒ **A** anticoagulant

☒ **B** antihypertensive

☒ **C** plant statin

☒ **D** platelet inhibitor

(Total for Question 4 = 9 marks)

5 Catalase is an enzyme found in many tissues. Catalase breaks down hydrogen peroxide into water and oxygen.

One molecule of catalase can break down millions of molecules of hydrogen peroxide in one second.

(a) Suggest why one molecule of catalase can break down hydrogen peroxide so quickly.

(3)

(b) A student investigated the activity of catalase present in a range of different foods. He investigated three vegetables: cannellini beans, potatoes and carrots. He also investigated bananas and milk.

The table below shows the results of this investigation.

Food	Catalase present or absent
Bananas	present
Cannellini beans	absent
Carrots	present
Milk	absent
Potatoes	present

(i) Another student made the following conclusions from these results:

- all vegetables contain catalase
- bananas contain more catalase than potatoes
- milk contains catalase
- products made from carrots may contain catalase.

Place a cross ☒ in the box next to the number of correct conclusions made by this student.

(1)

☒ **A** none

☒ **B** one

☒ **C** two

☒ **D** three

*(ii) Describe an experiment to investigate the effect of cooking on catalase activity in potatoes.

(6)

(Total for Question 5 = 10 marks)

6 (a) The diagram below shows part of a template (antisense) DNA strand.

A	G	C	G	C	T	T	G	C

DNA replication and transcription will produce different molecules from this DNA strand. Compare the molecules that will be produced, from this strand of DNA, by DNA replication and by transcription.

(3)

*(b) Translation follows transcription.

Describe how translation produces a polypeptide chain, using the code from this template strand of DNA.

(6)

(Total for Question 6 = 9 marks)

7 An investigation was carried out to study the effect of caffeine on heart rate.

Three students were selected for this investigation. The resting heart rate of each student was measured.

The students were then given a caffeine-containing energy drink. The heart rate of each student was measured afterwards.

The results of this investigation are shown in the table below.

Student	Resting heart rate / beats per minute	Heart rate after a caffeine-containing energy drink / beats per minute
1	75	88
2	79	84
3	60	72

(a) Describe how these results could be used to calculate the mean increase in heart rate.

(3)

(b) Describe how the reliability of this investigation could be increased.

(2)

(c) Suggest how this investigation could be improved to confirm that the caffeine caused the increase in heart rate.

Give an explanation for your answer.

(2)

(Total for Question 7 = 7 marks)

8 Human lungs are adapted for rapid gaseous exchange.

(a) (i) Place a cross ☒ in the box next to the features of the gas exchange surface in the lungs that allow rapid gaseous exchange.

(1)

☒ **A** large surface area and high concentration gradient

☒ **B** large surface area and low concentration gradient

☒ **C** small surface area and high concentration gradient

☒ **D** small surface area and low concentration gradient

(ii) Place a cross ☒ in the box next to the cell transport mechanism involved in gaseous exchange.

(1)

☒ **A** active transport

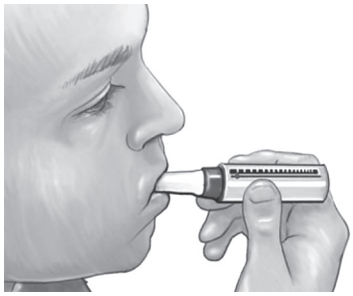
☒ **B** diffusion

☒ **C** facilitated diffusion

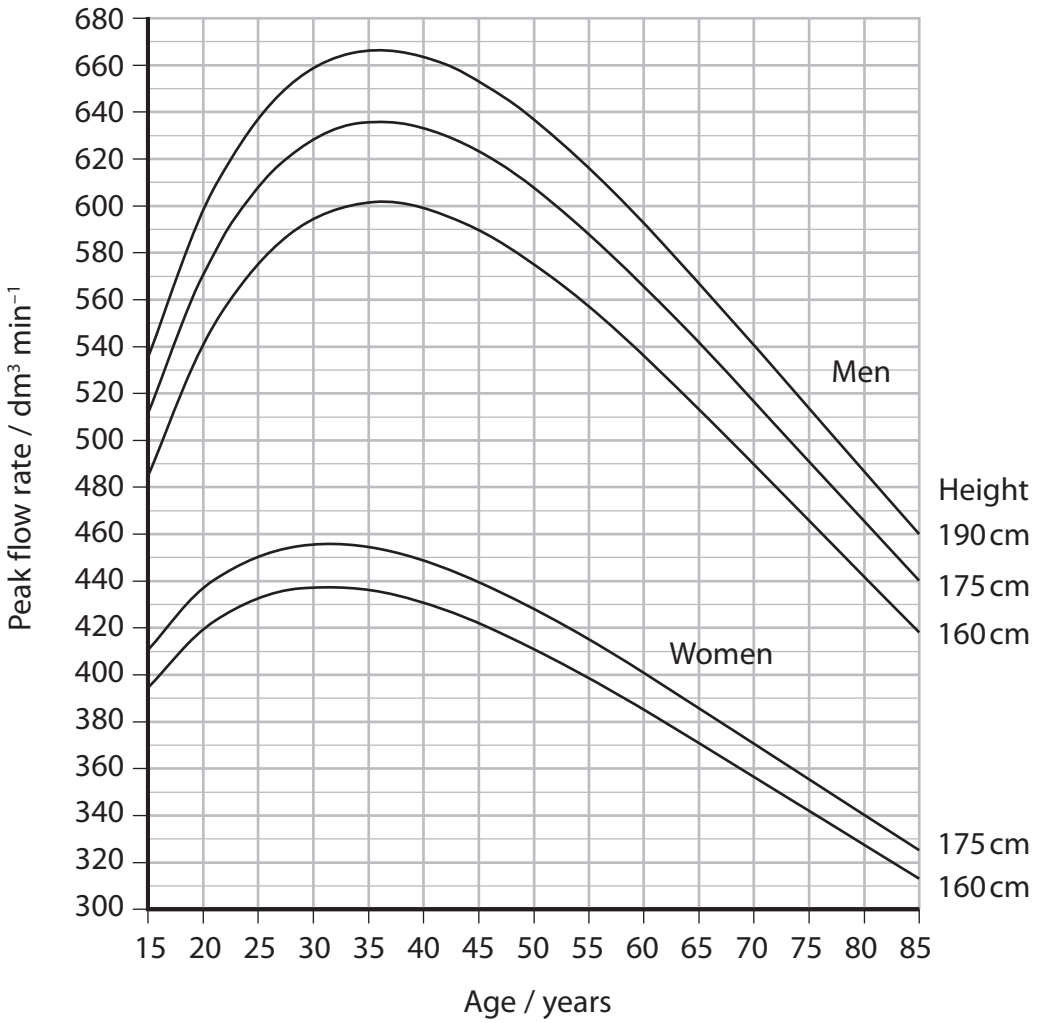
☒ **D** osmosis

(b) A peak flow meter is a hand-held device that measures airflow through the bronchi. Peak flow is the maximum rate at which air can be breathed out.

The diagram below shows an example of a peak flow meter being used.



The graph below shows peak flow readings for healthy men and healthy women of different ages and of different heights.



(i) Using the information in the graph, describe the difference in peak flow rate of men and women of the same height.

Suggest an explanation for this difference.

(3)

(ii) Suggest how the graph might look for women of height 190 cm.

(2)

(c) People with cystic fibrosis have a reduced rate of gaseous exchange and lower peak flow rates than people who do not have this condition.

Explain why people with cystic fibrosis have a lower peak flow rate.

(4)

(Total for Question 8 = 11 marks)

TOTAL FOR PAPER = 80 MARKS