

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel**  
**International**  
**Advanced Level**

Centre Number

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Candidate Number

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**Monday 7 January 2019**

Morning (Time: 1 hour 30 minutes)

Paper Reference **WBI01/01**

**Biology**

**Advanced Subsidiary**

**Unit 1: Lifestyle, Transport, Genes and Health**

**You must have:**

Calculator, ruler, HB pencil

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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**Answer ALL questions.**

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

**1** Triglycerides and polynucleotides are molecules found in organisms.

(a) Put a cross  in the box to complete each of the following statements.

(i) Triglycerides are composed of

(1)

- A** one fatty acid and one glycerol molecule
- B** one fatty acid and three glycerol molecules
- C** three fatty acids and one glycerol molecule
- D** three fatty acids and three glycerol molecules

(ii) The bond between a fatty acid molecule and a glycerol molecule is

(1)

- A** a hydrogen bond
- B** a phosphodiester bond
- C** an ester bond
- D** an ionic bond

(iii) The base that is found in DNA but not in RNA is

(1)

- A** adenine
- B** cytosine
- C** thymine
- D** uracil



(iv) 30% of the mononucleotides in the DNA found in a skin cell contain thymine.

In the same sample of DNA, the percentage of mononucleotides containing cytosine would be

(1)

- A 10%
- B 20%
- C 30%
- D 40%

(b) There are differences between the bases present in DNA and in RNA.

State **two** other differences between the structure of DNA and the structure of RNA.

(2)

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(c) Fatty acids may be saturated or unsaturated.

The table below gives information about the fatty acids present in coconut oil.

Fatty acid	Type	Percentage of total (%)
caprylic	saturated	7.9
capric	saturated	6.7
lauric	saturated	47.5
myristic	saturated	18.1
palmitic	saturated	8.8
stearic	saturated	2.6
oleic	unsaturated	6.5
linoleic	unsaturated	1.9

(i) One coconut contains 70 g of coconut oil.

Using the information in the table, calculate the mass of fatty acids with carbon-carbon double bonds present in this coconut.

Show your working.

(3)

..... g



(ii) Suggest **two** reasons why the percentage of each fatty acid may vary between different batches of coconut oil.

(2)

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**(Total for Question 1 = 11 marks)**

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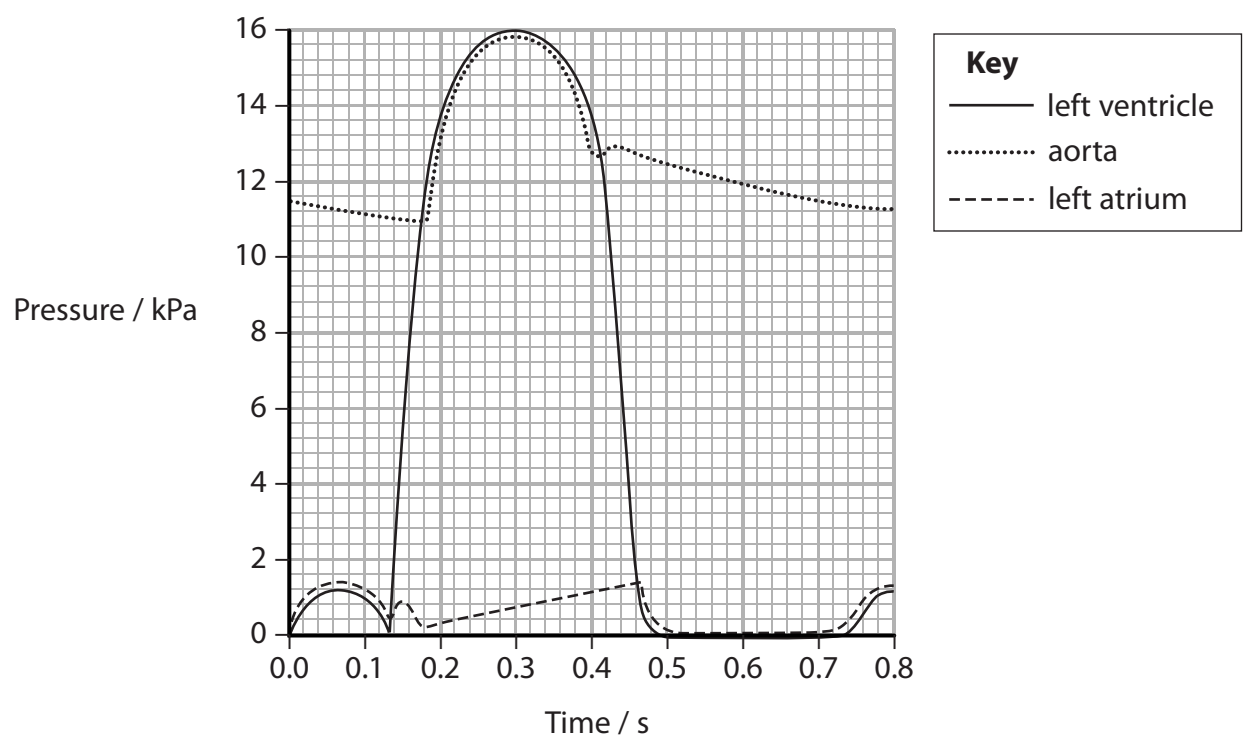
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2 The cardiac cycle describes the sequence of events taking place in the heart to bring about changes in blood pressure.

(a) The graph below shows the changes in blood pressure in the aorta, left ventricle and left atrium.



(i) Using the information in the graph, calculate the heart rate.

Show your working.

(2)

..... beats per minute



(ii) Using the information in the graph, calculate the maximum change in pressure in the aorta.

(1)

..... kPa

(iii) Using the information in the graph, state the time at which the atrioventricular valve closes.

(1)

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(b) Explain the pressure changes in the left atrium between 0.0 s and 0.1 s.

(2)

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(c) The maximum pressure in the right ventricle is lower than the maximum pressure in the left ventricle.

Explain the importance of this pressure difference.

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**(Total for Question 2 = 8 marks)**





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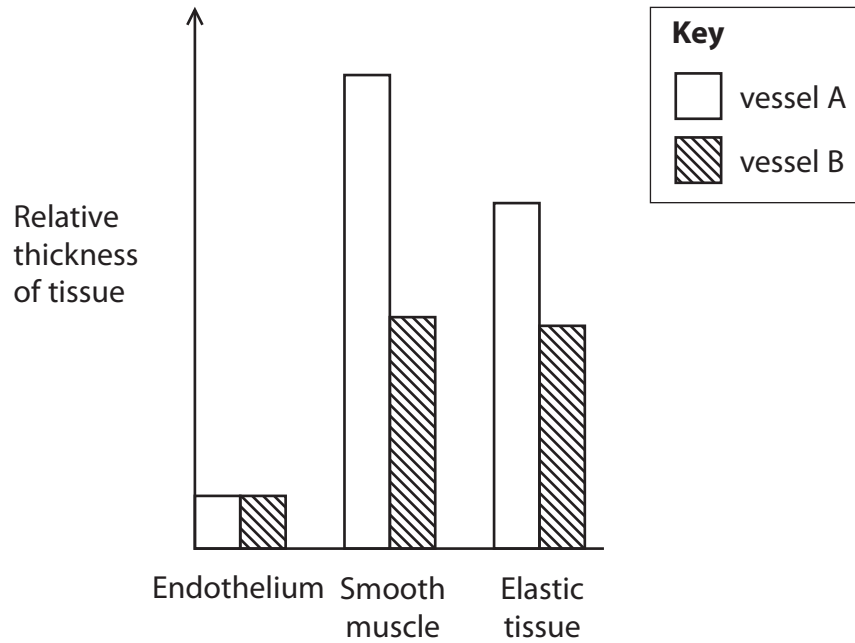
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- 3 The walls of arteries and veins include endothelium, smooth muscle tissue and elastic tissue.

The graph below shows the relative thickness of these tissues in the walls of two blood vessels with a similar diameter.



(a) (i) Using the information in the graph, state which of the vessels A and B is an artery and which is a vein.

(1)

Vessel A .....

Vessel B .....

(ii) Explain the roles of each of these tissues in blood vessels.

(3)

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(b) Describe how the structure of veins ensures the flow of blood in one direction only.

(1)

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(c) Warfarin is an anticoagulant drug that can be used to treat cardiovascular disease (CVD).

(i) Explain the benefits of warfarin in the treatment of CVD.

(3)

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(ii) State **one** risk associated with the use of warfarin.

(1)

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(iii) Name **one** group of drugs, other than anticoagulants, that can be used to treat CVD.

(1)

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**(Total for Question 3 = 10 marks)**



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4 Mutations can affect the phenotype and the genotype of an individual.

(a) (i) State what is meant by the term **genotype**.

(1)

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(ii) Explain what is meant by the term **phenotype**.

(2)

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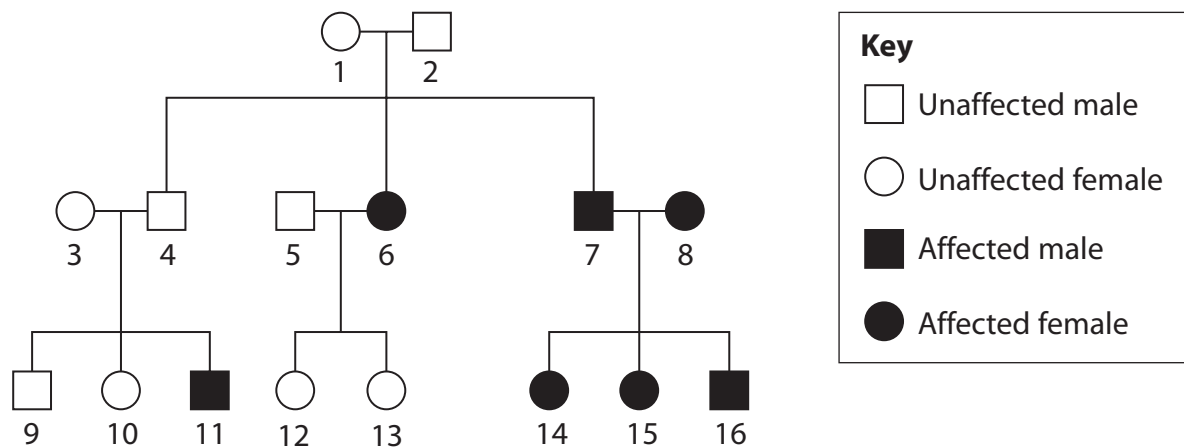
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P 5 4 6 5 6 A 0 1 3 2 4

- (b) Albinism is an inherited condition caused by a gene mutation. Individuals affected by albinism are unable to produce the enzyme tyrosinase.

The diagram below shows the inheritance of albinism in a family.



- (i) Put a cross  in the box to show which of these individuals are heterozygous for this condition.

(1)

- A** 1 and 2  
 **B** 5 and 6  
 **C** 7 and 8  
 **D** 10 and 11

- (ii) Using a suitable genetic diagram, state the probability that the next child of parents 3 and 4 will be affected by albinism.

(4)

Probability .....



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(c) Some children with albinism have serious eye problems. Gene therapy to treat albinism is being developed.

(i) Explain how gene therapy could be used to treat individuals affected by albinism. (3)

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(ii) Discuss the ethics of using genetic screening to identify carriers for albinism. (2)

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**(Total for Question 4 = 13 marks)**



5 Cystic fibrosis is caused by a mutation in the CFTR gene.

Cystic fibrosis is classified according to the effect of the mutation on the CFTR protein.

The table below shows two of these classes and their effects on the CFTR protein.

Class	Effect on CFTR protein
IV	has a faulty opening to the pore
VI	synthesised but breaks down quickly

(a) Explain how the primary structure of the CFTR protein will determine its 3-dimensional structure.

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(b) (i) Suggest how the function of the CFTR protein will be affected by a class IV mutation. (2)

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(ii) Suggest how the CFTR protein is broken down in a class VI mutation. (2)

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(c) Explain why people with a class IV mutation have a reduced concentration gradient for oxygen in their lungs.

(4)

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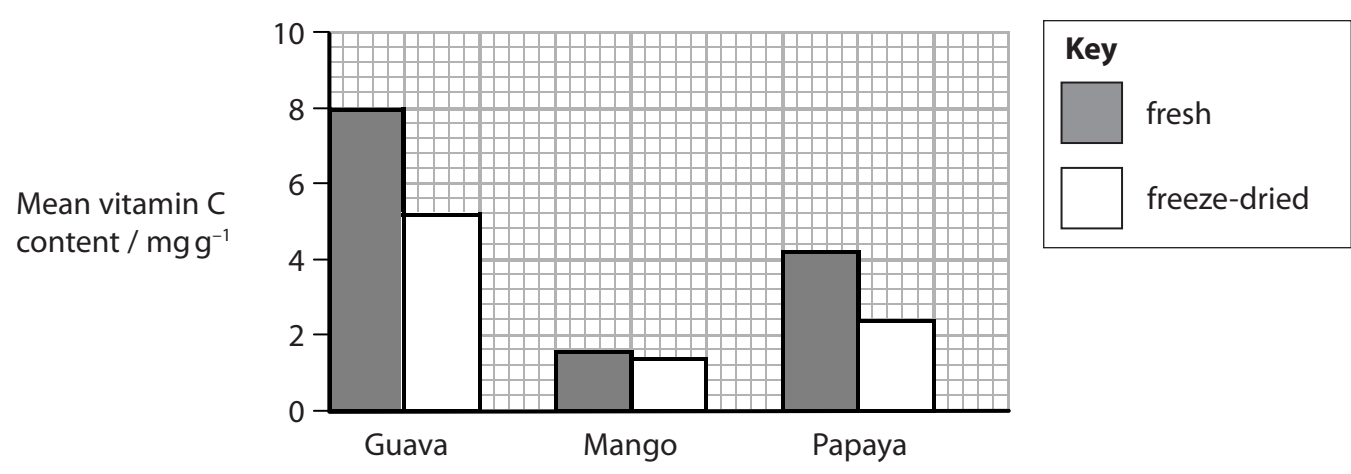
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6 A group of students investigated the effect of freeze-drying on the vitamin C content of three tropical fruits. The vitamin C content of these three fruits in their fresh form was also determined.

The graph below shows the results of this investigation.



(a) Using the information in the graph, describe the effect of freeze-drying on the vitamin C content of the fruit.

(3)

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\*(b) Describe an experiment that could be carried out to make a valid comparison of the vitamin C content of these three fruits.

(6)

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**(Total for Question 6 = 9 marks)**



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7 The photograph below shows a desert rat. Desert rats are small mammals that have a high demand for oxygen.



Magnification  $\times 0.5$

\*(a) Explain how the mammalian lung is adapted to carry out rapid gas exchange.

(6)

Area with horizontal dotted lines for writing the answer.



(b) (i) Name the blood vessel that carries blood from the heart to the lungs.

(1)

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(ii) Blood passes through the heart of a desert rat twice for each circulation of the body.

Explain why this is an advantage to this mammal.

(3)

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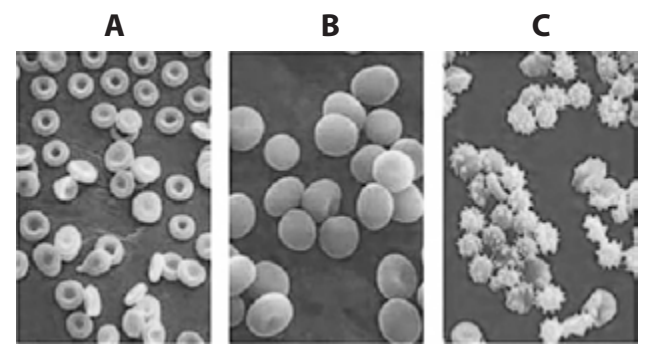
**(Total for Question 7 = 10 marks)**



8 Red blood cells are stored in solutions to be used in blood transfusions. It is important that the solutions have an appropriate concentration of solutes.

An investigation was carried out into the effect of three different sodium chloride solutions on red blood cells.

The photographs below show red blood cells in each of the solutions, **A**, **B** and **C**. Each solution contains sodium chloride and glucose. Solution **A** is the control.



Magnification  $\times 400$

(a) Put a cross  in the box to complete the following statement.

The solute concentration in solution **B** is

(1)

- A** higher than the concentration of solution **A**
- B** higher than the concentration of solution **C**
- C** lower than the solute concentration in the cells in solution **A**
- D** the same as the solute concentration in the cells in solution **A**

(b) Explain the appearance of the red blood cells in solution **B**.

(3)

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(c) Put a cross ☒ in the box to complete the following statement.

The process by which glucose passes through the cell membrane is

(1)

- A endocytosis
- B exocytosis
- C facilitated diffusion
- D osmosis

(d) The movement of sodium ions through the red blood cell membrane depends on the relative concentrations of these ions inside and outside the cell.

Explain this statement.

(3)

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**(Total for Question 8 = 8 marks)**

**TOTAL FOR PAPER = 80 MARKS**

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