

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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Tuesday 21 May 2019

Afternoon (Time: 1 hour 30 minutes)

Paper Reference **WBI01/01**

Biology

Advanced Subsidiary

Unit 1: Lifestyle, Transport, Genes and Health

You must have:

Calculator, HB pencil, ruler

Total Marks

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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 spelling, punctuation and grammar, as well as the clarity of expression may be assessed.
- 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 All living organisms rely on a variety of biological molecules.

Carbohydrates and lipids are biological molecules.

(a) (i) Below is a list of carbohydrates.

- glucose
- lactose
- maltose
- sucrose

Put a cross in the box next to the number of these carbohydrates that are disaccharides.

(1)

- A 1
- B 2
- C 3
- D 4

(ii) Starch is a carbohydrate that breaks down into glucose.

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

The type of reaction that breaks down starch into glucose is

(1)

- A condensation
- B esterification
- C hydrolysis
- D synthesis



P 5 6 1 4 7 A 0 3 2 8

(b) Lipids can be saturated or unsaturated.

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

(i) A saturated lipid with the same number of carbon atoms as an unsaturated lipid has

(1)

- A** more hydrogen atoms
- B** fewer hydrogen atoms
- C** the same number of hydrogen atoms
- D** no hydrogen atoms

(ii) Saturated lipids have

(1)

- A** no double bonds
- B** C=C and C=O
- C** C=C only
- D** C=O only

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(c) Starch is a storage carbohydrate in plants.
Barley grains contain a high proportion of starch.
The photograph below shows barley plants.



Magnification $\times 1$

Explain how the structure of starch makes it suitable for the storage of energy.

(3)

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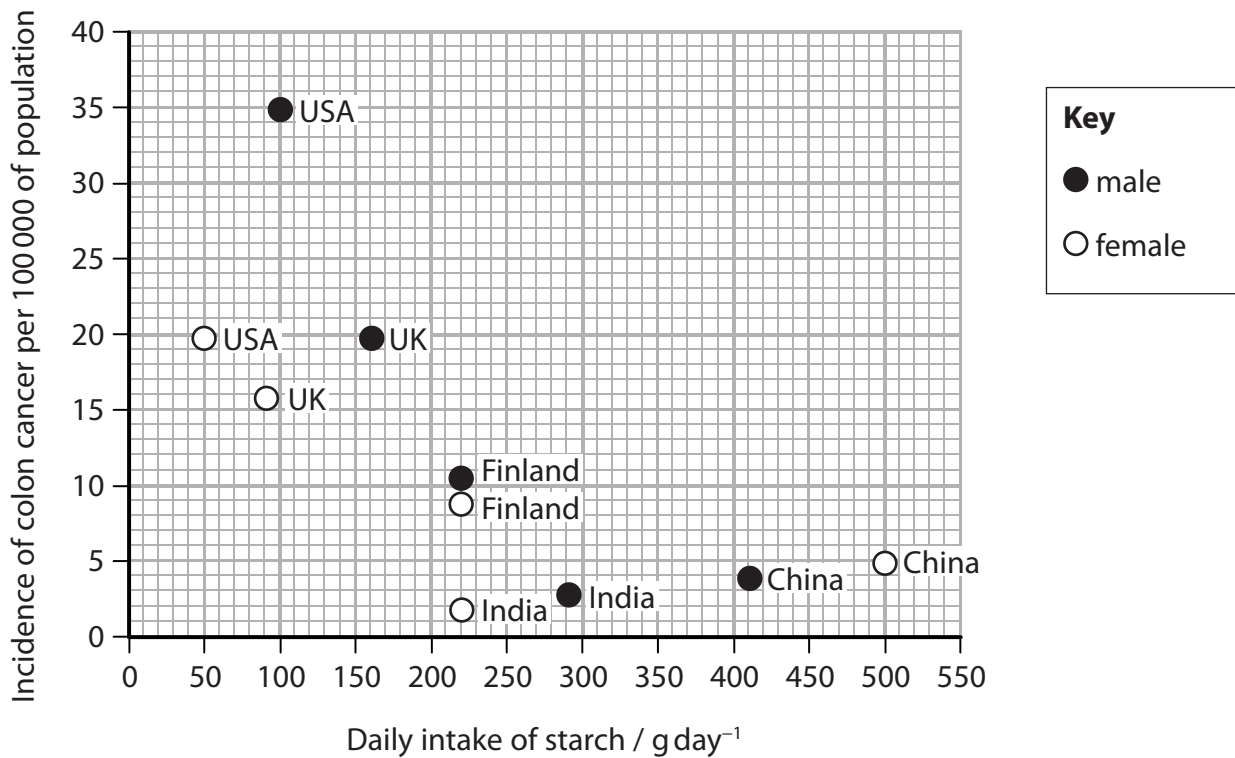
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(d) Scientists have studied the relationship between daily intake of starch and the incidence of colon cancer in humans in five countries.

The graph below shows the results of this study.



(i) State the relationship between the daily intake of starch and the incidence of colon cancer.

(1)

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(ii) Suggest **one** reason for the difference in the daily intake of starch between men and women.

(1)

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2 *Daphnia* are small invertebrates that live in ponds and lakes.

The photograph below shows a *Daphnia*.



Magnification $\times 25$

A student investigated the effect of temperature on the heart rate of *Daphnia*.

The table below shows the results of this investigation.

Temperature / $^{\circ}\text{C}$	Heart rate / beats min^{-1}
10	78
15	82
20	96
25	150
30	178

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(c) State **two** reasons why *Daphnia* are suitable organisms to use in this investigation.

(2)

1

2

(Total for Question 2 = 8 marks)

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3 Collagen is a fibrous protein found in bones.

Brittle bone disease is a rare condition caused by a dominant allele. This allele is the result of a mutation in a gene coding for the production of collagen.

The photograph below shows an X-ray of an adult with brittle bone disease.



Magnification $\times 0.2$

(a) Name the bond that joins amino acids together to form collagen.

(1)



P 5 6 1 4 7 A 0 1 1 2 8

(b) In the space below, draw a genetic pedigree diagram to show two parents, heterozygous for brittle bone disease, and all their possible offspring.

Use the symbols shown in the key.

(2)

Key

- affected female
- affected male
- unaffected female
- unaffected male

(c) Brittle bone disease can be caused by a mutation in the COL1A1 gene.

(i) Explain how prenatal testing can be used to identify this condition.

(4)

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(ii) Suggest **two** reasons why prenatal testing for brittle bone disease is not offered to all pregnant women.

(2)

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2

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(Total for Question 3 = 9 marks)

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4 The polynucleotides DNA and RNA are found in living organisms.

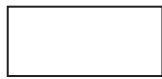
Both are composed of chains of mononucleotides.

(a) A mononucleotide consists of three components joined together by covalent bonds.

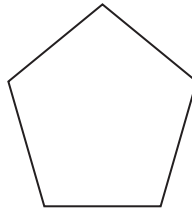
Use the following symbols to draw a diagram of a mononucleotide.

(2)

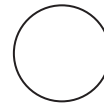
base



pentose sugar



phosphate group



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- (b) The photograph below shows a sea urchin, a marine invertebrate that lives on the seabed.



Magnification $\times 1$

A scientist analysed a section of DNA from a sea urchin. The section was 249 base pairs long and 17.5% of the bases were cytosine.

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

- (i) The maximum number of amino acids this section of DNA could code for is (1)

- A 82
 B 83
 C 164
 D 166

- (ii) The percentage of thymine bases present in this section of DNA is (1)

- A 17.5%
 B 32.5%
 C 35.0%
 D 65.0%



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5 Several risk factors may contribute to the development of cardiovascular disease (CVD).

The table below shows the percentage contribution of different risk factors to the development of CVD.

Risk factor	Percentage contribution to CVD (%)
inactivity	11
smoking	19
obesity	13
high blood cholesterol	26

(a) Give **one** reason why the percentage total in the table is less than 100%.

(1)

(b) Obesity can be estimated using the body mass index (BMI) of a person.

$$\text{BMI} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

The table below can be used to identify the category to which a person belongs.

Category	BMI range
underweight	below 18.5
healthy	18.5 to 24.9
overweight	25 to 29.9
obese	30 or above



Calculate the minimum mass for an overweight person who is 1.92 metres tall.

Show your working.

(2)

..... kg

(c) Cholesterol is transported in the blood as lipoproteins.

High levels of low density lipoproteins (LDLs) are known to increase the risk of CVD.

Over half of all adults in the UK have raised blood cholesterol levels ($\geq 5 \text{ mmol dm}^{-3}$).

(i) Name the type of drug used to reduce blood cholesterol levels. State **one** risk associated with its use.

(2)

Type of drug.....

Risk.....

.....

.....



6 Cell membranes control which molecules can leave or enter a cell.

(a) Active transport, diffusion and facilitated diffusion are methods of transporting molecules across cell membranes.

(i) Put a cross in the box next to the number of these methods that use protein pumps **and** ATP.

(1)

A 0

B 1

C 2

D 3

(ii) Put a cross in the box next to the number of these methods that use passive transport **and** move molecules against a concentration gradient.

(1)

A 0

B 1

C 2

D 3

(b) Endocytosis and exocytosis transport molecules through the cell membrane.

Compare endocytosis with exocytosis.

(2)

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(c) Beetroot cells contain a red pigment.

A student investigated the effect of temperature on the loss of pigment from beetroot cells.

Six cubes of beetroot were cut. One cube of beetroot was placed into a test tube containing 20 cm^3 of water and left for 30 minutes at 5°C .

The cube was then removed and the colour of the solution recorded using a scale of 0 to 5, where 0 indicates no colour and 5 indicates the darkest colour.

This procedure was repeated at five more temperatures.

The table below shows the results of the investigation.

Temperature / $^\circ\text{C}$	Colour of solution / a.u.
5	1
20	2
35	3
50	4
65	5
80	5

(i) Using the information in the table, describe the effect that temperature has on the loss of pigment from beetroot cells.

(2)

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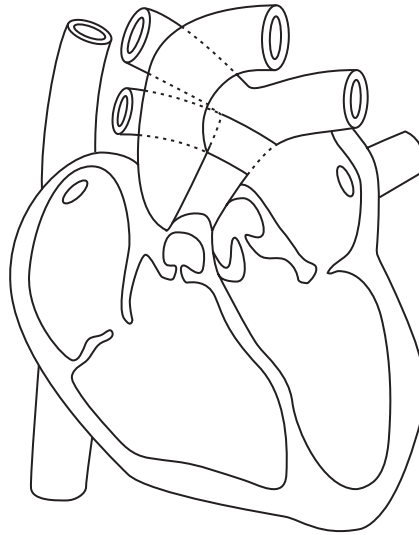
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7 The diagram below shows a section through a mammalian heart.



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

(1)

(ii) On the diagram, draw arrows to show blood entering the right ventricle of the heart and flowing towards the lungs.

(2)

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(ii) Suggest **two** reasons why a change in one amino acid in prothrombin may have no effect on the blood clotting process.

(2)

1

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(Total for Question 8 = 10 marks)

TOTAL FOR PAPER = 80 MARKS

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