

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 8 October 2018

Morning (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

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 labeled 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. Write your answers in the spaces provided.

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 There is a variety of organic molecules in living organisms.

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

(i) Monosaccharides form disaccharides by the formation of

(1)

- ☐ A a glycosidic bond
- ☐ B a hydrogen bond
- ☐ C an ester bond
- ☐ D an ionic bond

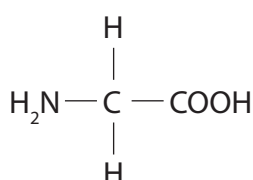
(ii) Glycogen can be converted to glucose.

The type of reaction taking place is

(1)

- ☐ A condensation
- ☐ B esterification
- ☐ C hydrolysis
- ☐ D replication

(b) The diagram below shows the structure of the amino acid glycine.



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- (i) Draw a diagram to show the structure of the molecules produced when **two** molecules of glycine are joined together.

(3)

- (ii) Name the type of molecule produced when several amino acids are joined together.

(1)

- (c) Explain how water is involved in the transport of molecules in living organisms.

(3)

(Total for Question 1 = 9 marks)



P 5 5 4 1 7 A 0 3 2 4

2 The development of cardiovascular disease (CVD) is often linked to high blood pressure.

(a) Explain what is meant by the term **cardiovascular disease**.

(2)

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

Drugs used to treat high blood pressure are called

(1)

- ☐ A anticoagulants
- ☐ B antihypertensives
- ☐ C platelet inhibitors
- ☐ D statins

(c) State **two** risk factors, other than high blood pressure, that contribute to the development of CVD.

(2)

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- (d) The table below shows the death rate from CVD in various European countries in 2011. Males and females under the age of 65 are included in the data.

Countries	Death rate from CVD / per 100 000 of population
France, Italy, Israel	under 40
Ireland, Germany	40 to 49
Finland, Malta	50 to 59
Turkey, Poland	60 and over

- (i) Suggest why the data are presented as deaths per 100 000.

(1)

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- (ii) In Poland, the death rate from CVD in 2011 was 115 per 100 000 of population.
In 2001, the death rate from CVD was 141 per 100 000.

Calculate the percentage decrease in the death rate.

Show your working.

(2)

..... %



P 5 5 4 1 7 A 0 5 2 4

(iii) Suggest an explanation for the difference in the death rates from CVD in Poland between 2001 and 2011.

(3)

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(Total for Question 2 = 11 marks)

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- 3 The photograph below shows a hand of a person with Marfan syndrome on the left. The photograph also shows a hand of an unaffected person on the right.



Marfan syndrome affects 1 in 4 000 people. This syndrome is caused by a gene mutation that is a dominant allele.

- (a) Explain what is meant by each of the following terms.

(i) Gene mutation

(2)

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(ii) Dominant allele

(2)

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- (b) (i) Draw a genetic diagram to show all the possible children of a male heterozygous for this syndrome and an unaffected female.

On your diagram, show the genotypes and the phenotypes of the parents and their children.

(4)

- (ii) The first child of these parents is affected by this syndrome.

State the probability that their **next** child will also have this syndrome.

(1)

(Total for Question 3 = 9 marks)

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4 Polynucleotides, DNA and RNA, are involved in protein synthesis.

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

Both DNA and RNA

(1)

- ☐ A are single-stranded
- ☐ B contain deoxyribose
- ☐ C contain phosphate groups
- ☐ D contain uracil

(b) (i) The diagram below shows the messenger RNA base sequence produced from a DNA strand.

U	G	A	A	G	C	G	G	C	U
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Write the sequence of bases in the original DNA template strand in the boxes below.

(2)

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

The number of codons in a messenger RNA molecule containing 900 mononucleotides is

(1)

- ☐ A 100
- ☐ B 300
- ☐ C 600
- ☐ D 900



P 5 5 4 1 7 A 0 9 2 4

* (c) Describe the stage of protein synthesis that occurs in the nucleus of a cell.

(5)

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(Total for Question 4 = 9 marks)



- 5 About 22% of the current UK population are classified as being obese. Obesity is linked to the development of CVD and type 2 diabetes.

Obesity can be estimated using the body mass index (BMI). BMI is calculated using the formula below.

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

- (a) Calculate the mass of a person with a BMI of 30 and a height of 1.95 metres.

(2)

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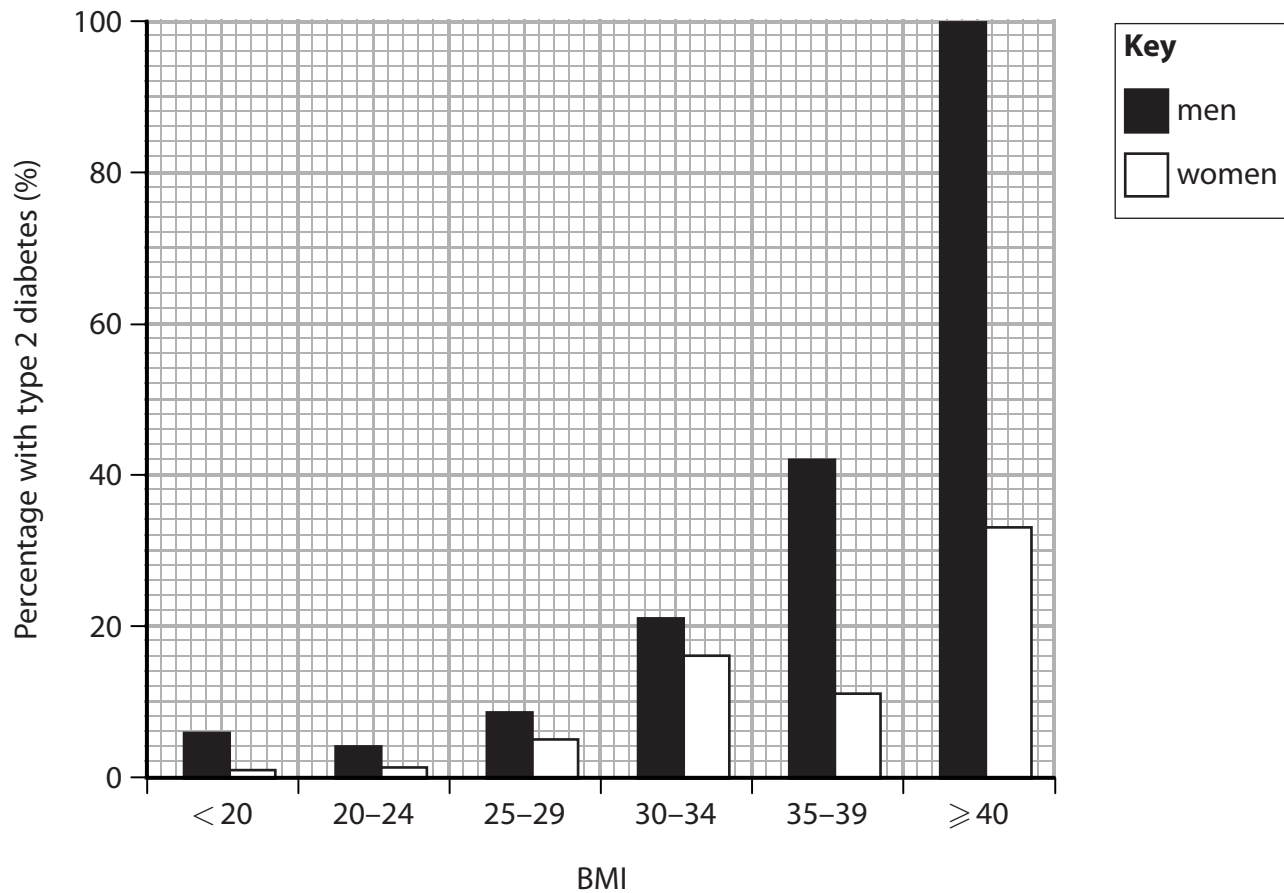


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- (b) Type 2 diabetes can be caused by the pancreas not producing enough of the hormone insulin. As a result, blood glucose levels remain high.

Studies show that about 90% of people with type 2 diabetes in the UK have a BMI over 30.

The graph below shows the results of a recent study to investigate the link between type 2 diabetes and BMI in both men and women.



- (i) Using the information in the graph, describe the relationship between BMI and the incidence of type 2 diabetes in **men**.

(2)

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(ii) Compare the incidence of type 2 diabetes in men and in women.

(3)

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(c) Suggest how an obese man should change his lifestyle.

(2)

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(d) Food diaries are a way of allowing people with type 2 diabetes to monitor their diet at home by recording their daily diet.

Suggest **two** reasons why this might not be a reliable method for monitoring diet.

(2)

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(Total for Question 5 = 11 marks)



6 Blood clots in veins and arteries may lead to heart attacks.

(a) (i) Put a cross (☒) in the box that completes the following statement.

(1)

The role of thrombin in the blood clotting process is to

- ☐ A activate the enzyme thromboplastin
- ☐ B catalyse the conversion of fibrinogen to fibrin
- ☐ C stimulate the release of fibrinogen
- ☐ D stimulate the release of prothrombin

(ii) Explain how a blood clot can cause a heart attack.

(3)

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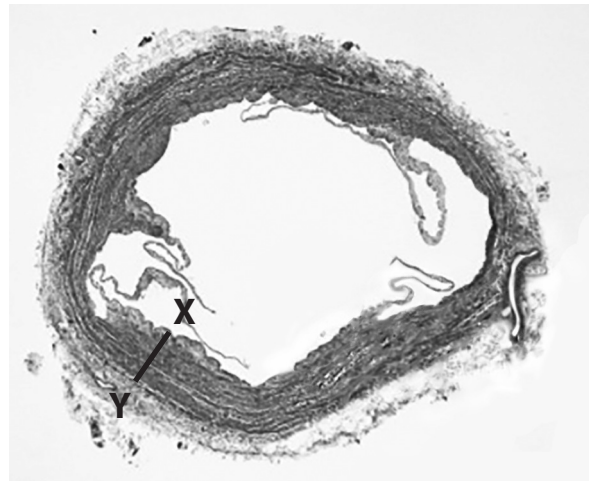
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- (b) The photograph below shows a cross section of a large vein, as seen using a light microscope.



Magnification $\times 12$

Calculate the actual thickness of the wall of this vein between **X** and **Y**.
Show your working.

(2)

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

* (c) Explain how the structure of an artery is related to its function.

(5)

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(Total for Question 6 = 11 marks)



7 Cystic fibrosis is an inherited disorder caused by a mutation in the CFTR gene.

(a) Explain how a mutation in the CFTR gene affects movement of water through the cell membrane.

(3)

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(b) Cystic fibrosis affects 1 in 3 000 children born in the UK. This disorder can be detected by prenatal genetic testing.

(i) Name **one** type of prenatal testing. Describe how this is carried out.

(3)

Type.....

How this is carried out.....

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(ii) Suggest why prenatal testing for cystic fibrosis is **not** offered to all pregnant women. (1)

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(iii) Discuss the ethical issues relating to the use of genetic screening. (3)

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(Total for Question 7 = 10 marks)

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P 5 5 4 1 7 A 0 1 9 2 4

- 8 The photograph below shows two germinating pea seeds.



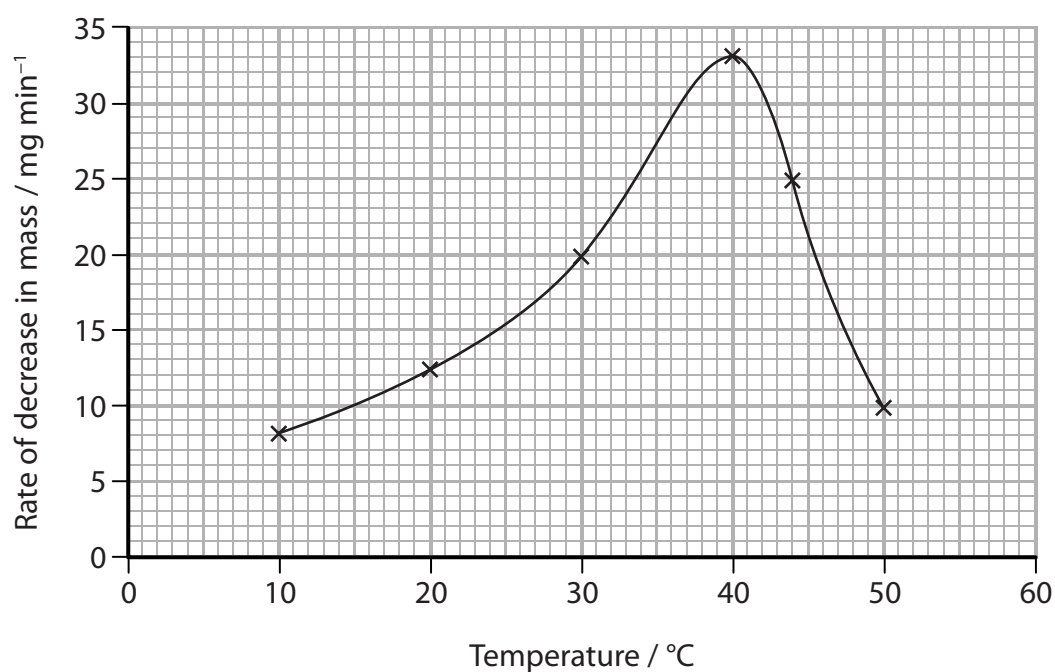
Magnification $\times 1$

Germinating peas contain an enzyme that breaks down starch.

The effect of temperature on the activity of this enzyme was investigated.

The rate of decrease in the mass of starch in germinating peas was measured at six temperatures.

The graph below shows the results of this investigation.



(a) Using the information in the graph, describe the relationship between the activity of this enzyme and temperature.

(3)

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(b) Explain why increasing the temperature above 40°C causes a change in the rate of decrease in the mass of starch.

(3)

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(c) Describe an experiment that could be carried out to confirm the results of this investigation.

(4)

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(Total for Question 8 = 10 marks)

TOTAL FOR PAPER = 80 MARKS

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