

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Tuesday 13 May 2025

Afternoon (Time: 1 hour 45 minutes)

Paper reference **1BI0/1H**

Biology
PAPER 1

Higher Tier

You must have:
Ruler, calculator

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 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- 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 (a) Figure 1 shows a percentile chart for the height of boys from age 2 to age 16.

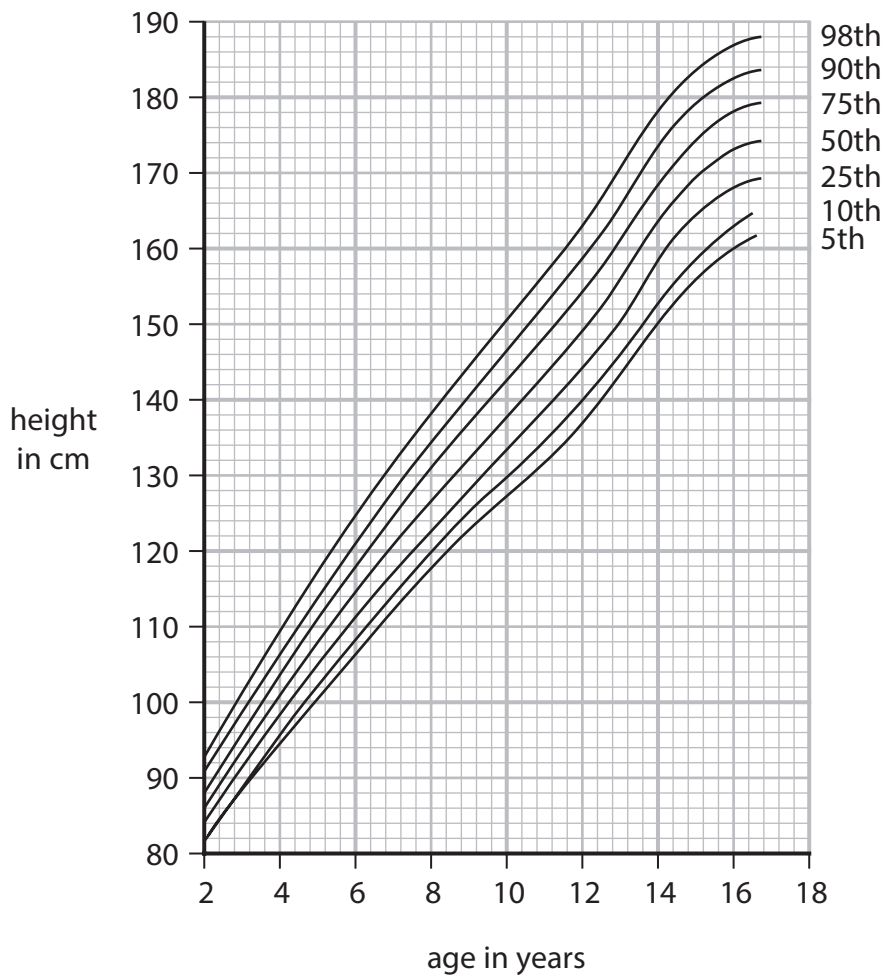


Figure 1

- (i) Which is the height of an 8-year-old boy on the 10th percentile?

(1)

- ☐ A 118 cm
☐ B 120 cm
☐ C 128 cm
☐ D 130 cm



(ii) The height of a 4-year-old boy was 94 cm.

Two years later, his height was 106 cm.

Using Figure 1, explain the conclusion that can be made about the growth of this child.

(2)

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(b) Fats are needed for energy.

(i) Describe how a sample of food can be tested to show that it contains fat.

(2)

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(ii) Which is produced when fats are digested?

(1)

- ☐ A amino acids
- ☐ B fatty acids
- ☐ C glucose
- ☐ D starch

(c) State what calorimetry is used to measure.

(1)

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(Total for Question 1 = 7 marks)



- 2 (a) Tuberculosis is a disease that is spread through airborne droplets.

Give **two** ways of reducing or preventing the spread of tuberculosis.

(2)

1

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2

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- (b) Obesity is a risk factor for some non-communicable diseases.

- (i) State why liver disease is a non-communicable disease.

(1)

.....

.....

- (ii) The waist-to-hip ratio can be used to show if excess weight is a health risk.

An adult has a waist measurement of 80 cm and a hip measurement of 90 cm.

Calculate the waist-to-hip ratio for this adult, using the equation:

$$\text{waist-to-hip ratio} = \frac{\text{waist measurement}}{\text{hip measurement}}$$

Give your answer to **two** decimal places.

(2)

waist-to-hip ratio



(iii) Figure 2 shows the health risk of some waist-to-hip ratios.

health risk	waist-to-hip ratios	
	males	females
low	0.95 or less	0.80 or less
medium	0.96 to 1.0	0.81 to 0.85
high	1.1 or more	0.86 or more

Figure 2

Explain the health risk for a female with a waist-to-hip ratio of 0.75.

(2)

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(c) Cancer occurs when cell division by mitosis is uncontrolled.

Describe the properties of cells produced by mitosis.

(2)

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(Total for Question 2 = 9 marks)

- 3 (a) Figure 3 shows a beaker containing a potato cylinder in distilled water.

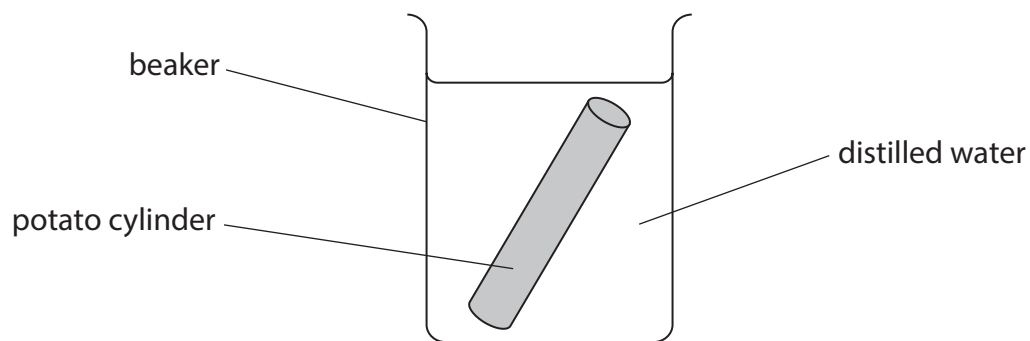


Figure 3

Explain why the mass of this potato cylinder will change when it is placed in distilled water.

(3)

(b) A scientist investigated the rate of diffusion using three agar cubes of different sizes.

Each cube contained a pH indicator that changed from pink to colourless when placed in acid.

The cubes were placed in a beaker containing an acid.

Figure 4 shows some information about each cube.

cube	length of each side of cube in cm	surface area in cm ²	volume in cm ³	surface area to volume ratio	time taken for the cube to become colourless in seconds
A	1.0	6	1	6 : 1	170
B	2.0	24	8	3 : 1	260
C	3.0	54	?	2 : 1	500

Figure 4

(i) Calculate the volume of cube C.

(2)

.....cm³

(ii) Explain the difference in the times taken for cubes A and B to become colourless.

(2)

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(Total for Question 3 = 7 marks)

- 4 (a) In the 19th century, Gregor Mendel studied genetic inheritance in pea plants.

Mendel made the conclusion that characteristics in organisms were determined by the inheritance of 'units'.

- (i) What are these 'units' of inheritance known as today?

(1)

- ☐ **A** chloroplasts
- ☐ **B** enzymes
- ☐ **C** genes
- ☐ **D** mitochondria

- (ii) Figure 5 shows one of Mendel's experiments on the inheritance of pea shape.

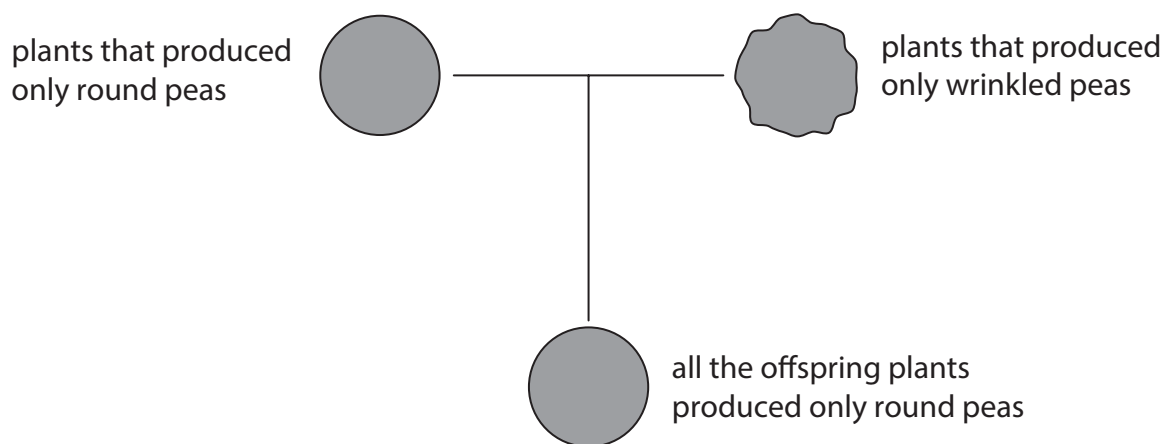


Figure 5

State the conclusion that Mendel was able to make about the wrinkled pea characteristic.

(1)

(b) A scientist crossed two pea plants that were heterozygous for pea shape.

- (i) Complete the Punnett square to show the inheritance of the alleles for pea shape and the percentage probability of producing a plant with wrinkled peas.

Use the letter R for the allele for round shape.

Use the letter r for the allele for wrinkled shape.

(3)

		heterozygous	
heterozygous			

percentage probability of producing a plant with wrinkled peas %

- (ii) Plants used to study inheritance are grown in controlled environmental conditions.

Suggest **two** ways of controlling these environmental conditions.

(2)

1

.....

2

.....

(c) Some plants can reproduce asexually and sexually.

- (i) Complete the table by writing **yes** or **no** in **each** box to show the features of asexual and sexual reproduction.

(3)

feature	asexual reproduction	sexual reproduction
produce genetically identical offspring		
requires male and female gametes		
rapid reproductive cycle		

- (ii) A zygote with a diploid nucleus is formed by sexual reproduction.

State what is meant by a diploid nucleus.

(1)

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(Total for Question 4 = 11 marks)



- 5 (a) A report stated that *Homo habilis* was a hominin species that lived on Earth between 2.4 million years ago and 1.5 million years ago.

(i) State the number of years that *Homo habilis* lived on Earth.

(1)

(ii) Fossil evidence suggests that *Homo habilis* used tools.

State **one** use of these tools.

(1)

(iii) Scientists use fossil discoveries to suggest the structure of the whole body.

Lucy is a fossil of the species *Australopithecus afarensis*.

Describe how the body structure suggested for *Australopithecus afarensis* is different from the body structure suggested for *Homo habilis*.

(2)

(iv) Explain what could have caused the extinction of *Australopithecus afarensis*.

(3)

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(b) Figure 6 shows how the three-domain classification system was developed.

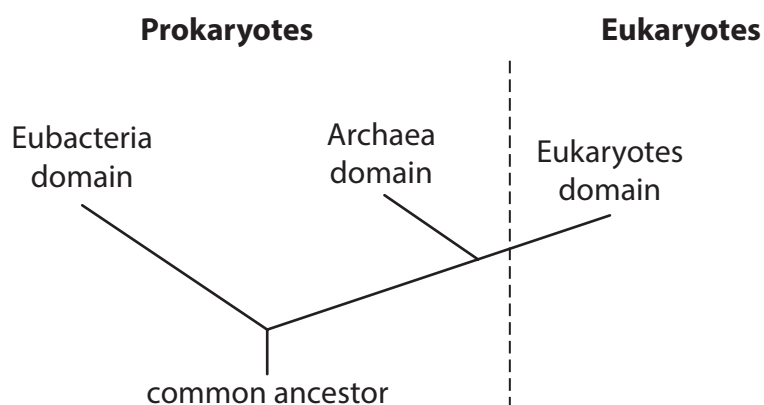


Figure 6

Describe the differences between prokaryotes and eukaryotes and why the three domain classification system was introduced.

(3)

(Total for Question 5 = 10 marks)

- 6 (a) The pathogen *Vibrio cholerae* causes the disease cholera.

Figure 7 shows *Vibrio cholerae* bacteria.

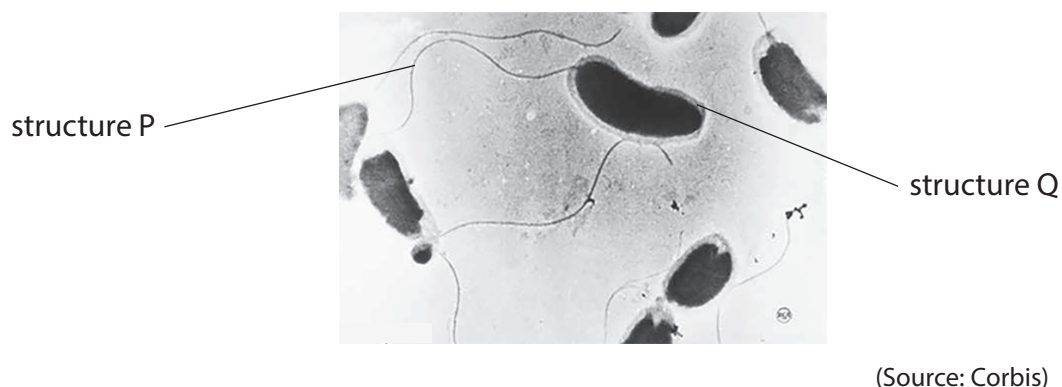


Figure 7

- (i) Complete the table to show the function of structure P and structure Q.

(2)

structure	function
P	
Q	

- (ii) On the original image, the length of one bacterial cell is 12 mm.

The actual length of this bacterial cell is $2.0\text{ }\mu\text{m}$.

Calculate the magnification.

(2)

magnification =

- (iii) State **one** symptom of the disease caused by *Vibrio cholerae*.

(1)

.....

.....

(iv) State how the disease caused by *Vibrio cholerae* is transmitted.

(1)

(b) Describe the specific immune response when a pathogen infects the body.

(3)

(Total for Question 6 = 9 marks)

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- 7 (a) Figure 8 shows a CT scan image of a person with a brain tumour.



(Source: © DUCANE MEDICAL IMAGING LTD/SCIENCE PHOTO LIBRARY)

Figure 8

- (i) Explain why tumours can be detected using CT scans.

(2)

- (ii) This person has reduced vision.

Name the part of the brain responsible for vision.

(1)

- (b) Tumours can also be detected by PET scanning.

Before a PET scan, a radioactive form of glucose is injected into the bloodstream of a person.

Explain why this glucose is injected before a PET scan.

(2)



- * (c) Some monoclonal antibodies have been approved for use in the diagnosis of blood clots.

Explain how monoclonal antibodies are produced and how they can be used in the diagnosis of blood clots.

(6)

(Total for Question 7 = 11 marks)



- 8 (a) Reaction time can be tested by dropping a ruler and measuring the distance it travels before it is caught.

Figure 9 shows how the test works.

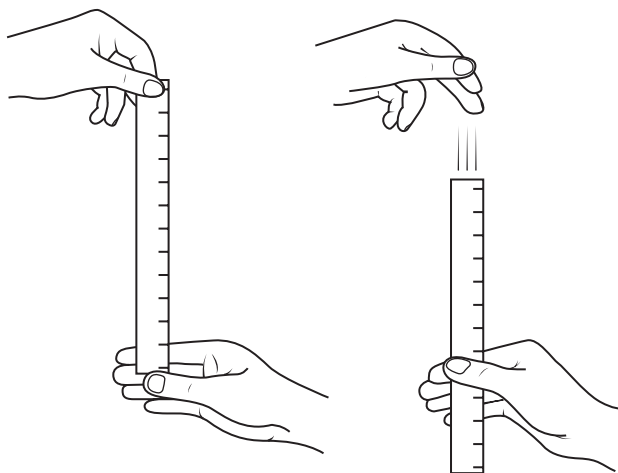


Figure 9

This method was used to test the reaction times of three students.

Each student completed the test five times and the distances were recorded.

- (i) State how the median distance for each student could be determined from the results.

(1)

- (ii) State and explain **one** variable that needs to be controlled in this investigation.

(2)

(iii) Figure 10 shows the results recorded for the three students.

student	distance in mm				
A	70	69	67	64	62
B	71	70	69	67	65
C	72	70	69	66	62

Figure 10

Explain **one** conclusion that can be made from the results in Figure 10.

(2)

(iv) A student wanted to investigate the effect of two different drinks containing caffeine on reaction time using this method.

Devise a plan the student could use.

(3)

(b) Figure 11 shows a myelinated sensory neurone.

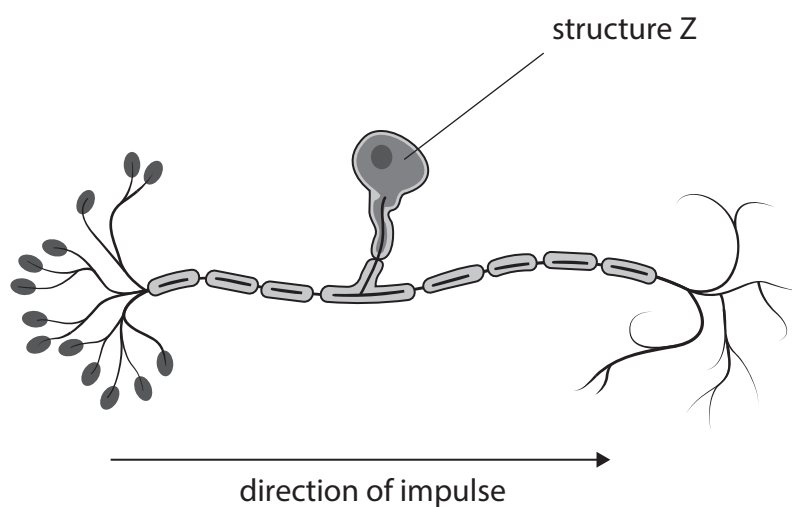


Figure 11

(i) Identify structure Z.

(1)

- (ii) Figure 12 shows how the diameter of neurones affects the speed of electrical impulses.

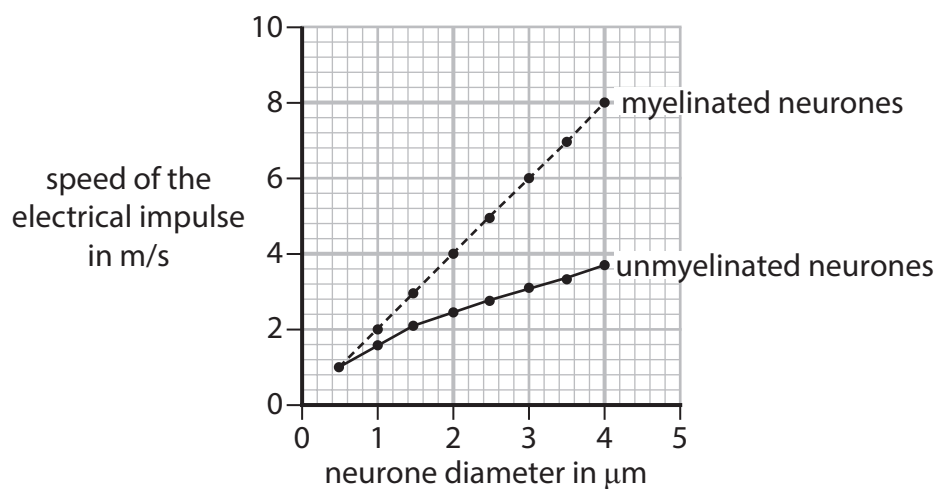


Figure 12

Comment on how the diameter of a neurone affects the speed of the electrical impulses.

(3)

(Total for Question 8 = 12 marks)

9 Genetic disorders can be caused by mutations in the DNA of genes.

(a) Cystic fibrosis is a recessive genetic disorder.

Figure 13 shows a family pedigree for the inheritance of cystic fibrosis.

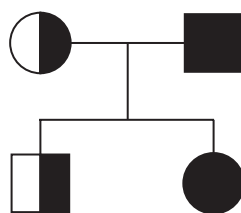


Figure 13

(i) Which row is correct for the mother, father and son?

(1)

	mother	father	son
☐ A	affected	unaffected	carrier
☐ B	carrier	affected	affected
☐ C	carrier	affected	carrier
☐ D	affected	affected	unaffected

(ii) Cystic fibrosis causes the build-up of thick, sticky mucus.

Describe how the build-up of thick, sticky mucus affects the airways of a person.

(2)

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(b) Huntington's disease is a condition caused by a dominant allele.

Explain the phenotypes of the offspring of a genetic cross between a person who is heterozygous for the Huntington's allele and a person who is not affected.

Use the Punnett square as part of your answer.

(4)



*(c) Explain how DNA is extracted from strawberries.

Include in your answer:

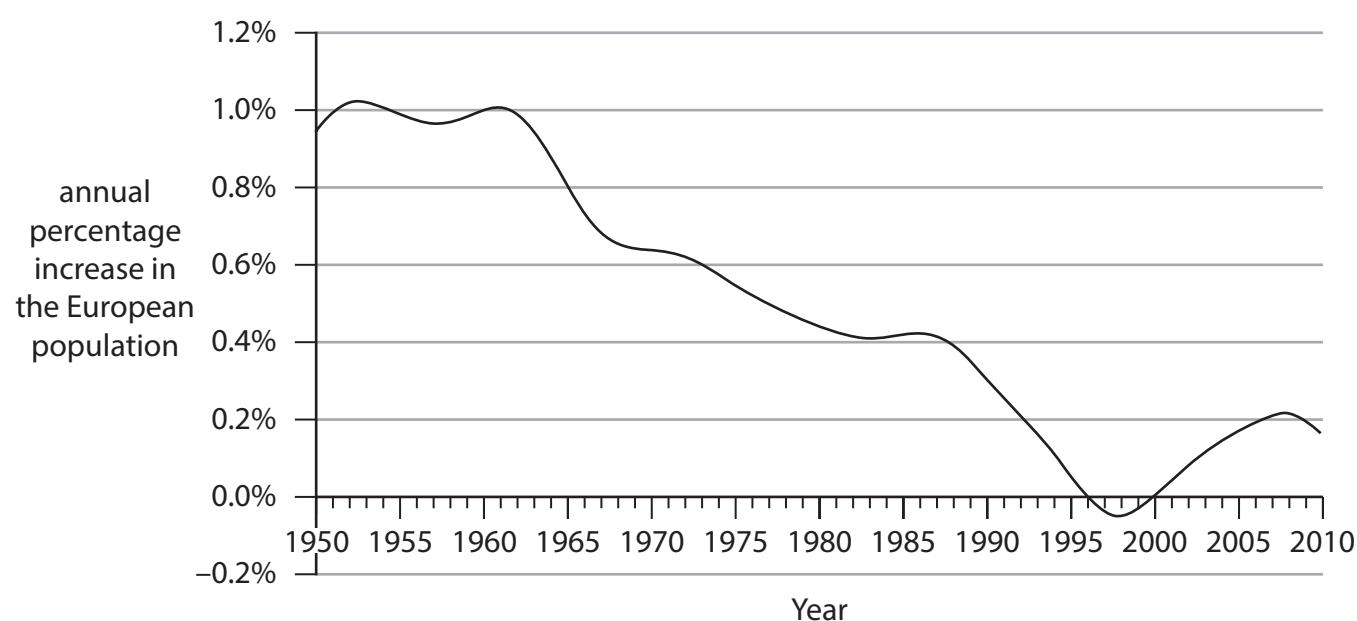
- the reasons for each stage of the extraction process
- the structure of a DNA molecule.

(6)

(Total for Question 9 = 13 marks)



- 10 (a) Figure 14 shows the annual percentage increase in the European population from 1950 to 2010.



(Source: UN World Population Prospects: The 2012 revision)

Figure 14

State the number of years when there was no annual increase in the European population.

(1)

- (b) Fertilisers are used by farmers.

- (i) Give **one** advantage and **one** disadvantage of using fertilisers.

(2)

advantage

disadvantage

- (ii) In an investigation, a farmer sprayed fertiliser onto three fields of the same size.

One field was sprayed with 1% fertiliser, one with 5% fertiliser and the third with 10% fertiliser.

Wheat was grown in all three fields.

Figure 15 shows the crop yield of wheat for each field.

percentage concentration of fertiliser (%)	yield of wheat in tonnes
1	3.12
5	3.75
10	3.62

Figure 15

Which is the percentage increase in the yield of wheat when 5% fertiliser was added compared with 1% fertiliser?

(1)

- ☐ **A** 4%
- ☐ **B** 17%
- ☐ **C** 20%
- ☐ **D** 83%

- (iii) The farmer concluded that the 5% solution of fertiliser was the best concentration to use.

State **two** improvements to this investigation that the farmer should make to confirm this conclusion.

(2)

1

2



- (c) Using ladybirds to reduce the number of aphids in a greenhouse is an alternative to using pesticides.

Which is the name for this method?

(1)

- ☐ **A** distribution analysis
- ☐ **B** selective breeding
- ☐ **C** biological control
- ☐ **D** genetic engineering

- (d) Describe how tissue culture is used to produce genetically identical plants.

(4)

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(Total for Question 10 = 11 marks)

TOTAL FOR PAPER = 100 MARKS



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