

Pearson Edexcel International Advanced Level

Friday 15 May 2026

Afternoon (Time: 1 hour 30 minutes)

**Paper
reference**

WBI12/01A

Biology

UNIT 2: Cells, Development, Biodiversity and Conservation
International Advanced Subsidiary/Advanced Level
Question Paper

You must have: Answer Book (sent separately).
Scientific calculator, ruler, HB pencil.
Do not return this question paper with the answer book.

Turn over ►

P81798A

©2026 Pearson Education Ltd.
P:1/1/1/1/1/1/




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** Species richness and index of diversity are indicators of the biodiversity within a habitat.

- 1** (a) Which is the correct definition for the term **species richness**?

(1)

- A** change in genetic diversity within a species
- B** genetic diversity within a species
- C** number of different species in a given area
- D** relative abundance of different species in a given area

- 1** (b) Herbicides are chemicals that can be used to kill plants.

The photograph shows a field with a high index of diversity.



(Source: © www.mjt.photography/Alamy)

Herbicides were sprayed onto the plants in this field.

Predict the effect on the index of diversity of this field.

Give a reason for your answer.

(2)

- 1 (c) The photograph shows a spiked rice flower plant.



(Source: © Bellamaree/Shutterstock)

This plant is an endangered species endemic to Australia.

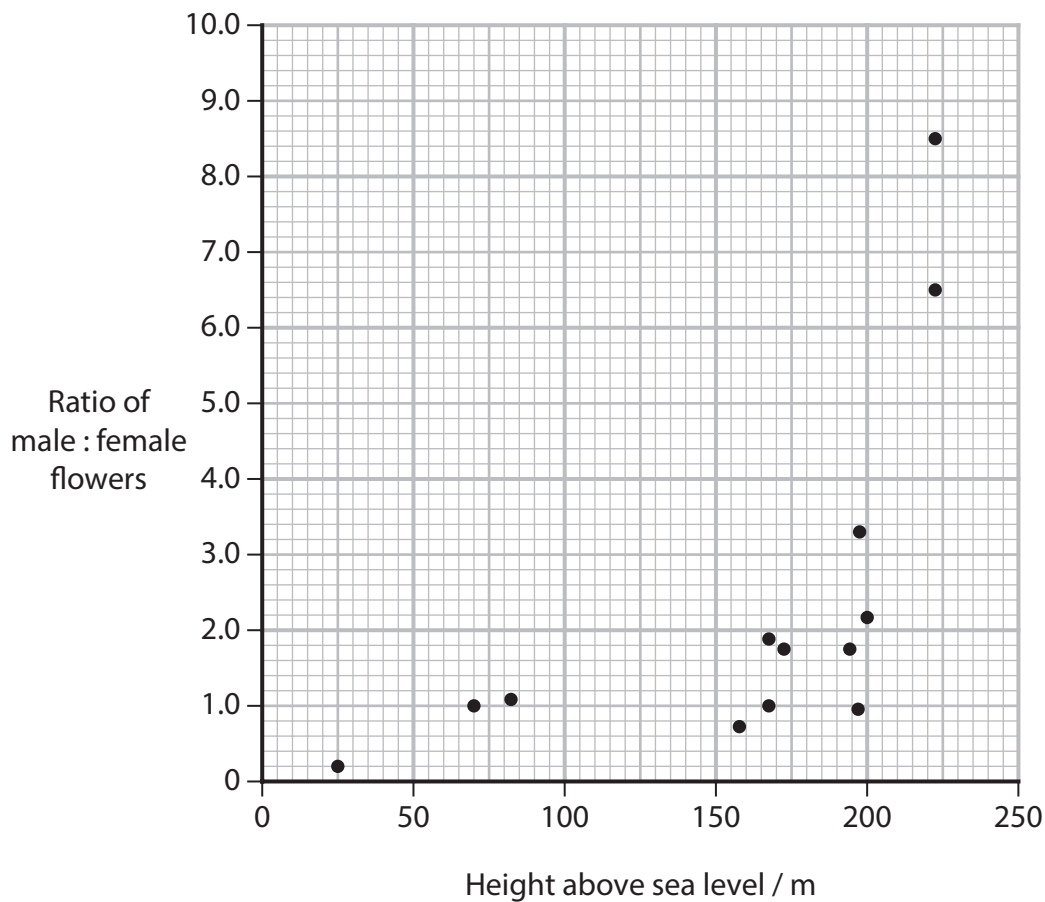
Describe how a seed bank could help to **conserve** the spiked rice flower plant.

(2)

- 1 (d) Another species of rice flower plant found in Australia is also endangered.

This plant produces flowers that are either male or female.

The graph shows how the height above sea level affects the ratio of male : female flowers produced by these plants.

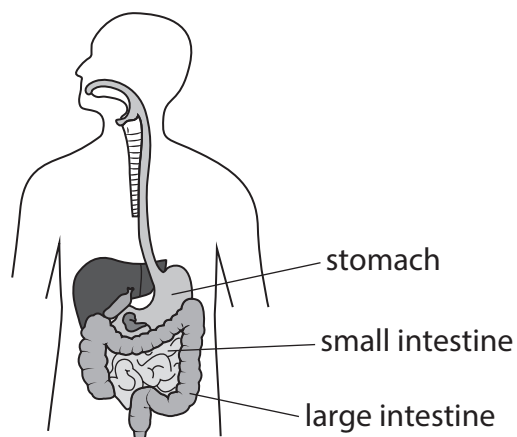


Describe the effect of height above sea level on the ratio of male : female flowers.

(2)

(Total for Question 1 = 7 marks)

2 The diagram shows the human digestive system.



2 (a) The human digestive system is an organ system.

State the meaning of the term **organ system**.

(1)

2 (b) Prokaryotic cells from **two** domains have been found in the human digestive system.

2 (b) (i) State the names of these **two** domains.

(1)

2 (b) (ii) Give **one** similarity and **one** difference between the structure of the cells in these two domains.

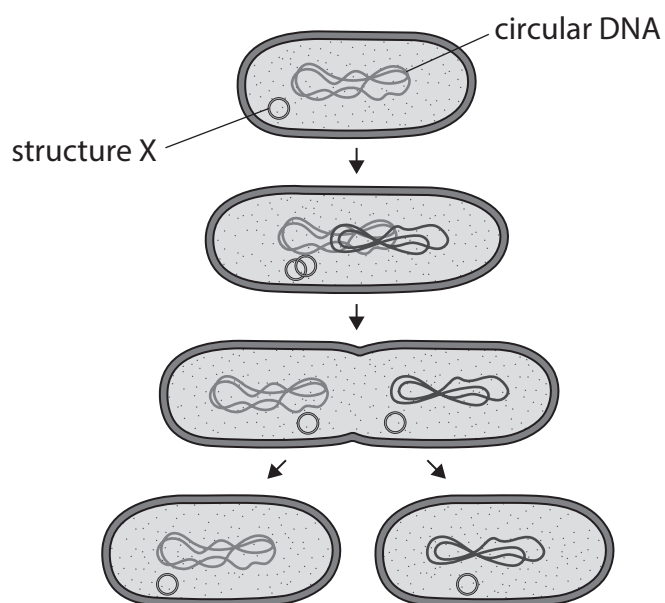
(2)

2 (b)(iii) *H. pylori* is a prokaryotic organism found in the stomach of some people.

Suggest why *H. pylori* can survive in the acidic stomach.

(2)

- 2 (c) The diagram shows cell division in a prokaryotic cell and a structure labelled X.



- 2 (c) (i) State the function of structure X.

(1)

- 2 (c) (ii) Some prokaryotic cells have a capsule.

Which row is correct for a prokaryotic cell capsule?

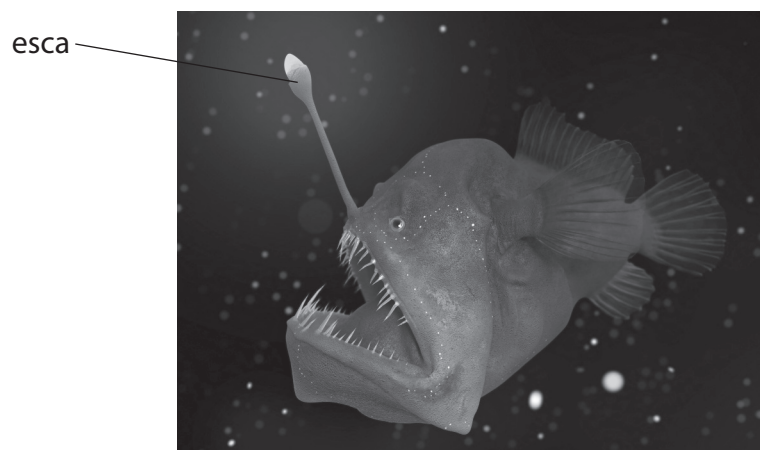
(1)

	Can cover membrane glycoproteins	Helps cell adhere to surfaces
A	✓	✗
B	✓	✓
C	✗	✗
D	✗	✓

(Total for Question 2 = 8 marks)

3 Organisms show adaptations to their environment.

3 (a) The photograph shows a deep-sea angler fish.



(Source: © Marko Steffensen/Alamy)

The esca is an organ of the deep-sea angler fish.

Bacteria live in the esca. These bacteria produce bioluminescent light.

This bioluminescent light attracts prey, such as smaller fish.

3 (a) (i) Suggest how the bacteria benefit from living inside the esca of the deep-sea angler fish.

(1)

3 (a) (ii) Which of the following describes the **niche** of this angler fish?

(1)

- A the bacteria living inside the esca
- B the part of the ocean where the angler fish lives
- C the prey of the angler fish
- D the role of the angler fish in its environment

3 (a) (iii) State how **one other anatomical** adaptation benefits the deep-sea angler fish.

Use the information in the photograph to support your answer.

(1)

- 3 (b) The phenotypes of siphonophore and a jellyfish are similar.

The photographs show a siphonophore and an Atlantic sea nettle jellyfish.



(Source: © imageBROKER.com/Alamy)

siphonophore



(Source: © Jamie Pham
Photography /Alamy)

Atlantic sea nettle jellyfish

- 3 (b) (i) The longest siphonophore has a length of 119 m whereas an Atlantic sea nettle jellyfish has a length of 89 cm.

Which is the ratio of siphonophore length : Atlantic sea nettle jellyfish length?

(1)

- A 0.007 : 1
- B 0.75 : 1
- C 1.34 : 1
- D 134 : 1

- 3 (b) (ii) Give **one** similarity between a siphonophore and an Atlantic sea nettle jellyfish.

Use the information in the photograph to support your answer.

(1)

- 3** (b)(iii) A siphonophore is a colony of several types of zooids, each attached to a central stem.

Each type of zooid has a different function in the colony.

The table shows the function of these zooids.

Zooid	Function
Gastrozooid	Tentacle with specialised stings or toxins, to capture and digest prey
Gonophore	Reproduction
Nectophores	Pump water backwards to move siphonophore through water
Tentilla	Emit light

Discuss the advantages of these zooids forming a single colony and not living as separate organisms.

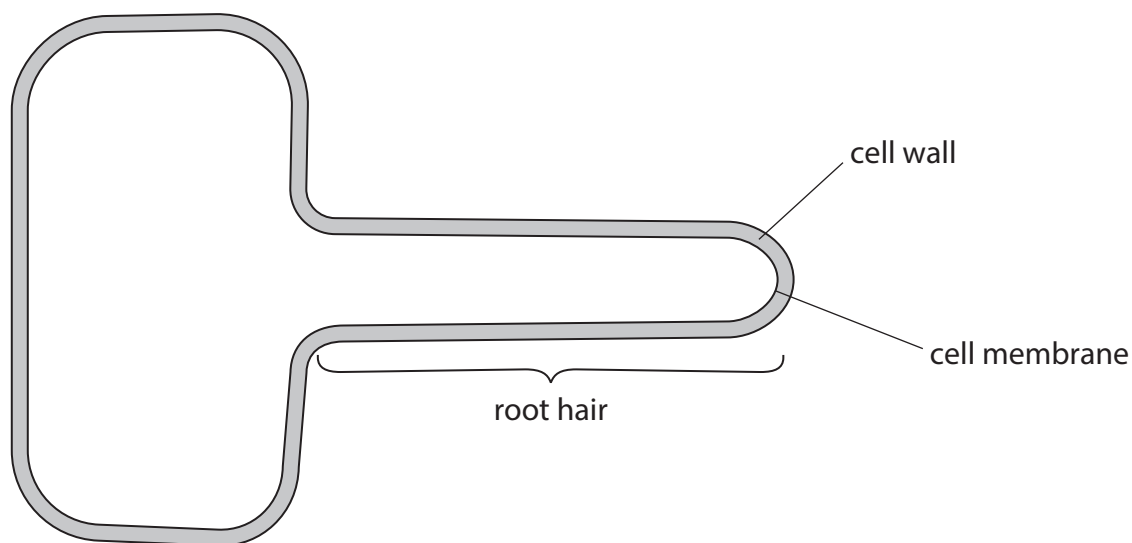
Use information from the question to support your answer.

(3)

(Total for Question 3 = 8 marks)

- 4 Plant root cells absorb water and other substances from the soil.

The diagram shows an incomplete root hair cell.



- 4 (a) Plant cells contain plasmodesmata.

State the function of plasmodesmata.

(1)

- 4 (b) Describe **two** functions of a cell membrane.

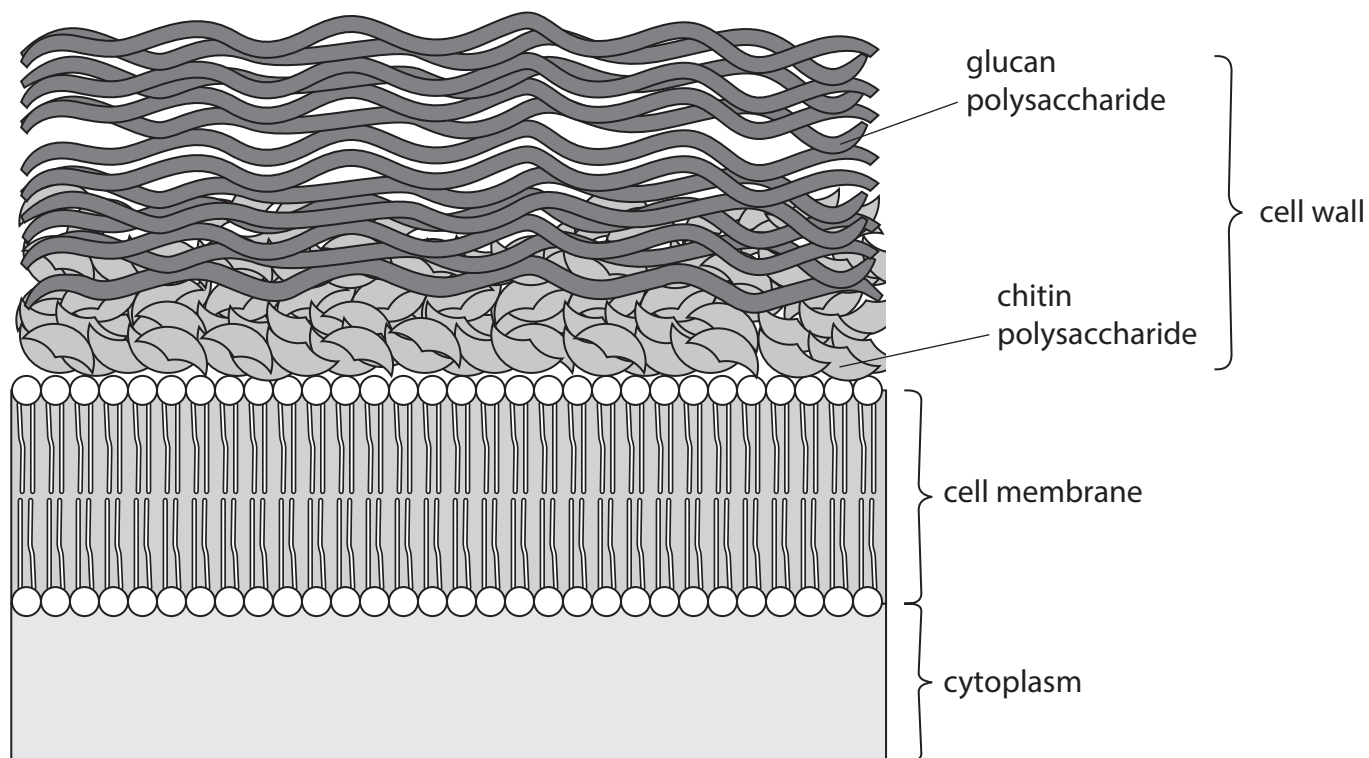
(2)

- 4 (c) Some root cells develop into root hair cells.

Suggest how the adaptations of root hair cells are beneficial to the growth of a plant.

(3)

4 (d) The diagram shows part of a cell wall and cell membrane of a fungus.



Describe how the structure of this fungal cell wall differs from a plant cell wall.

(3)

(Total for Question 4 = 9 marks)

- 5 Plants can produce substances that have antimicrobial and therapeutic properties.

Some of these substances can be extracted and used to make drugs.

These drugs are tested in drug trials.

- 5 (a) William Withering performed a drug trial.

Which is the active substance that William Withering extracted from foxglove plants and used in his drug trials?

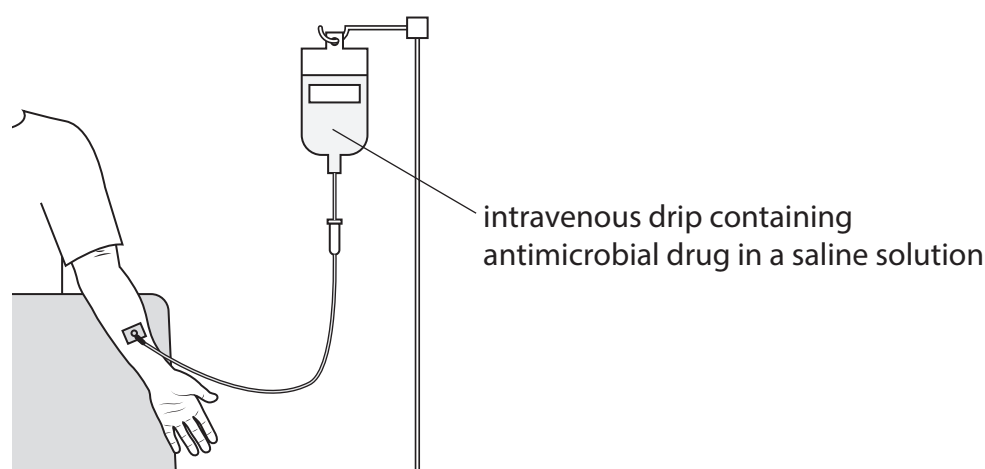
(1)

- A antibiotic
- B cytoplasm
- C digitalis
- D lysosome

- 5 (b) Drug trials may take many years to complete.

The results of each phase of a drug trial are analysed before the trial can continue to the next phase.

The diagram shows an antimicrobial drug being delivered directly into the blood of a **healthy** person through an intravenous drip during **phase I** of a drug trial.



The saline solution is made from 9.0g of salt dissolved in 1 dm³ of distilled water.

Negative side effects are recorded and analysed in a drug trial.

5 (b) (i) Which of the following should be used as a **placebo** in phase I of **this** drug trial?

1. a different antimicrobial drug given by intravenous drip
2. a pill containing sugar or other inactive substance
3. saline solution given by intravenous drip

(1)

A 1 and 2 only

B 1 and 3 only

C 2 only

D 3 only

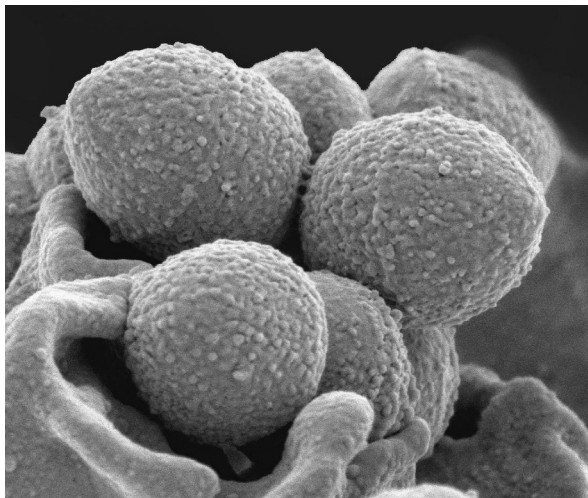
5 (b) (ii) State why a range of concentrations of this antimicrobial drug would be given to healthy volunteers in a phase I trial.

(1)

5 (c) Pharyngitis is a disease caused by infection with *Streptococci* bacteria.

One symptom is a sore throat.

The photograph shows some *Streptococci* bacteria, as seen using an electron microscope.

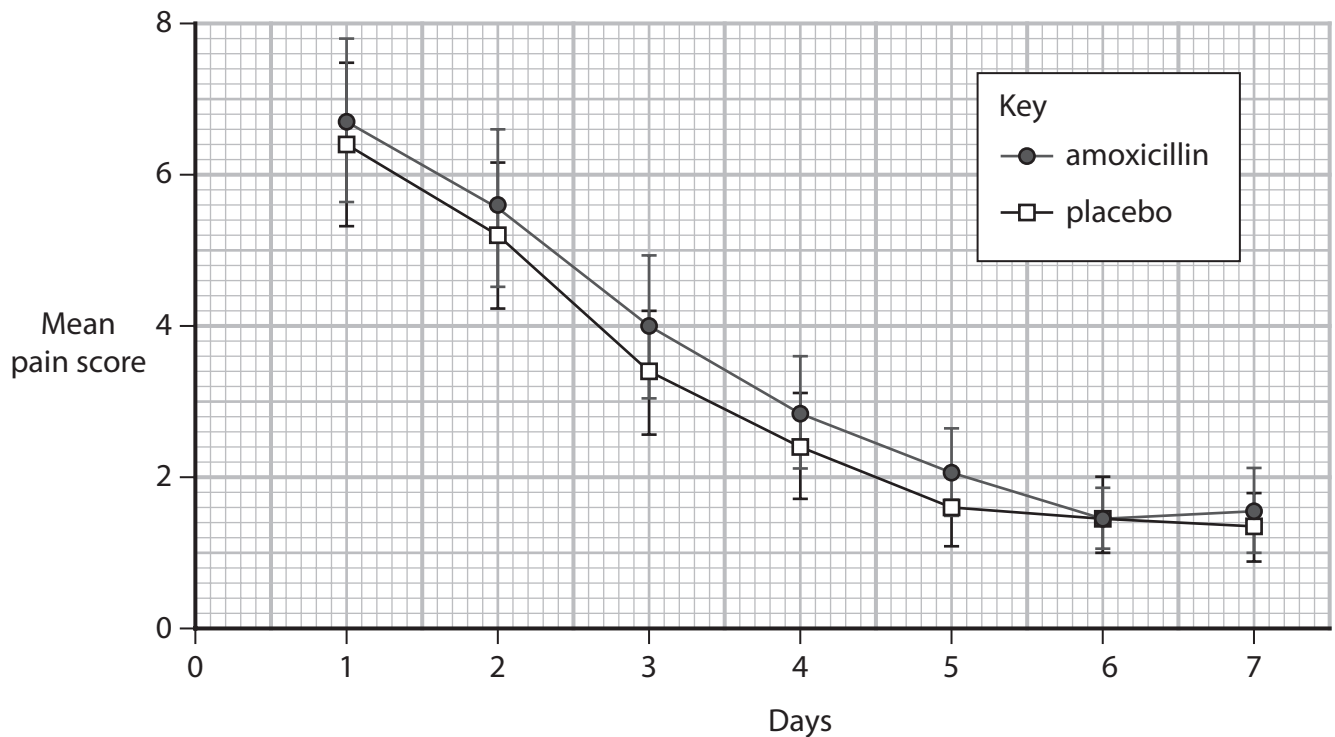


(Source: © Associated Press/Alamy)

Two groups of patients, diagnosed with pharyngitis, were given either amoxicillin or a placebo for seven days.

The patients were asked to score their throat pain at the end of each day.

The graph shows the mean pain score from each group.



- 5 (c) (i) Give a reason why it could be concluded that there was no significant difference between the effect of amoxicillin and the effect of the placebo on the mean pain score.

(1)

- 5 (c) (ii) Describe how a phase II drug trial could be carried out to determine if another antimicrobial drug was **more** effective against *Streptococci* bacteria than amoxicillin.

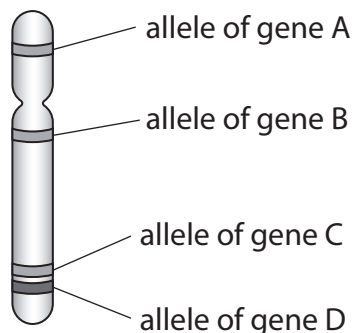
(4)

(Total for Question 5 = 8 marks)

- 6** A gene contains the DNA base sequence that codes for one or more proteins.

Different versions of genes are called alleles.

- 6** (a) The diagram shows the location of the alleles of four genes on a chromosome.



Explain which pair of alleles would be more likely to be inherited together.

(2)

- 6** (b) Some phenotypes are affected by multiple alleles for one gene.

- 6** (b) (i) Explain how the number of alleles can affect the phenotypes found in a population.

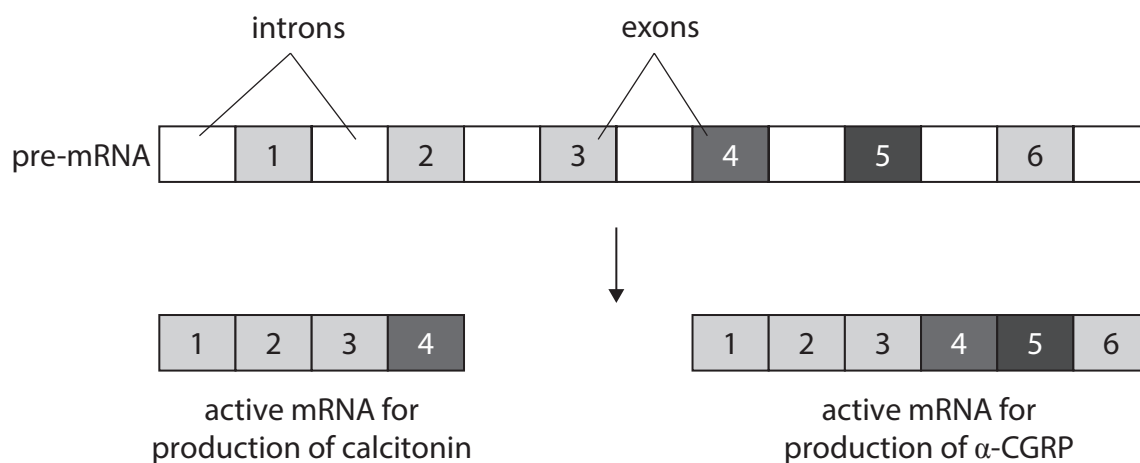
(3)

- 6** (b) (ii) Describe how the Hardy-Weinberg equation can be used to determine the change in allele frequency in a population.

(2)

6 (c) One gene can code for the production of more than one protein.

The diagram shows how the CGRP gene can code for the production of both calcitonin and α -CGRP.

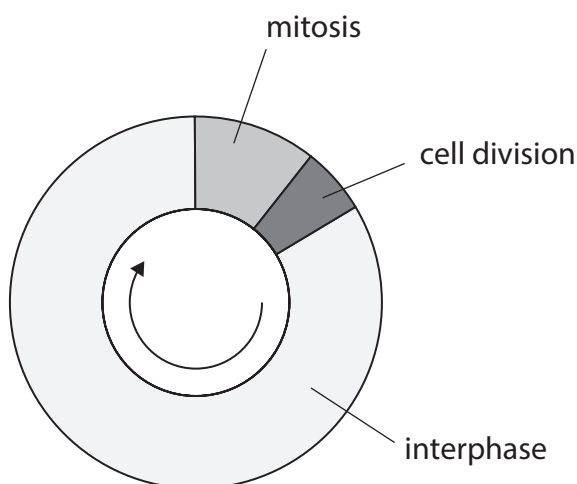


Explain how the CGRP gene can code for the production of both calcitonin and α -CGRP.

(4)

(Total for Question 6 = 11 marks)

7 The diagram shows the cell cycle.



- 7 (a) During interphase a spherical human cell increased in both volume and number of organelles.

The initial volume of the cell was $2000\mu\text{m}^3$.

After increasing in volume, the radius of the cell was $10\mu\text{m}$.

- 7 (a) (i) Calculate the **increase in volume** of this cell.

Give your answer as a whole number.

Use the formula:

$$V = \frac{4}{3}\pi r^3$$

(2)

- 7 (a) (ii) Explain why the number of organelles needs to increase during interphase.

(2)

- 7 (a) (iii) The mass of one human cell was 1 nanogram.

The DNA content of this cell at the **end** of interphase accounted for 6.2% of its mass.

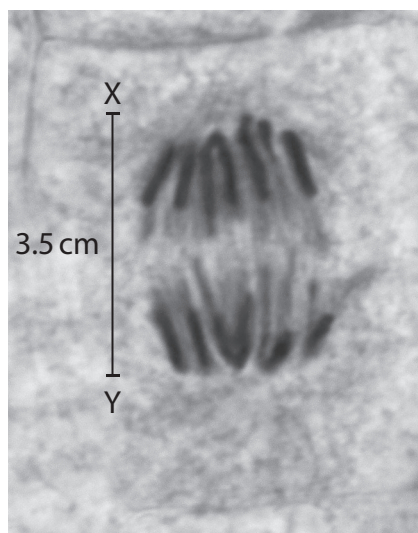
Calculate the mass of DNA in **one** of the daughter cells produced by cell division.

Give your answer in **picograms**.

1 nanogram = 1000 picograms

(2)

- 7 (b) The photograph shows a cell in the anaphase stage of mitosis.



(Source: © Alicia Gonzalez/Alamy)

- 7 (b) (i) The length of the line XY in the photograph is 3.5 cm.

The actual distance represented by the line XY is $94\text{ }\mu\text{m}$.

Calculate the magnification of this image.

Give your answer to **two** significant figures.

(2)

- 7 (b) (ii) The mean length of spindle fibres in one cell at a certain point in metaphase was $14.8\text{ }\mu\text{m}$.

The mean length of spindle fibres in the same cell at a certain point in anaphase was $9.2\text{ }\mu\text{m}$.

Explain why this change in mean length of spindle fibres has occurred.

(2)

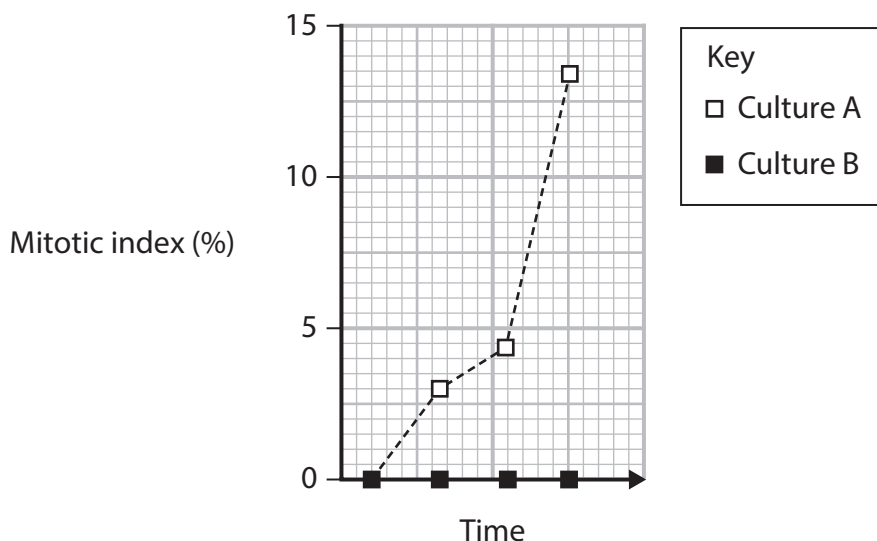
7 (c) Epigenetic modification can alter the activity of genes.

Two cultures of cells were used to investigate the effect of epigenetic modification of gene X on the cell cycle.

Cells in Culture A contained epigenetically modified gene X.

Cells in Culture B contained unmodified gene X that has functioning alleles.

The graph shows the mitotic index for each cell culture.



Deduce the effect on the cell cycle of the epigenetic modification of gene X.

Use the graph and your own knowledge to support your answer.

(4)

(Total for Question 7 = 14 marks)

8 Fertilisation in mammals involves male and female gametes.

A zygote is produced after fertilisation of a female gamete.

A zygote develops into a morula, a blastocyst and then an embryo.

8 (a) (i) Which is the correct definition of fertilisation?

(1)

- A** the entry of an egg cell by a sperm cell
- B** the entry of an egg cell nucleus by a sperm cell
- C** the fusion of egg cell and sperm cell membranes
- D** the fusion of an egg cell nucleus and a sperm cell nucleus

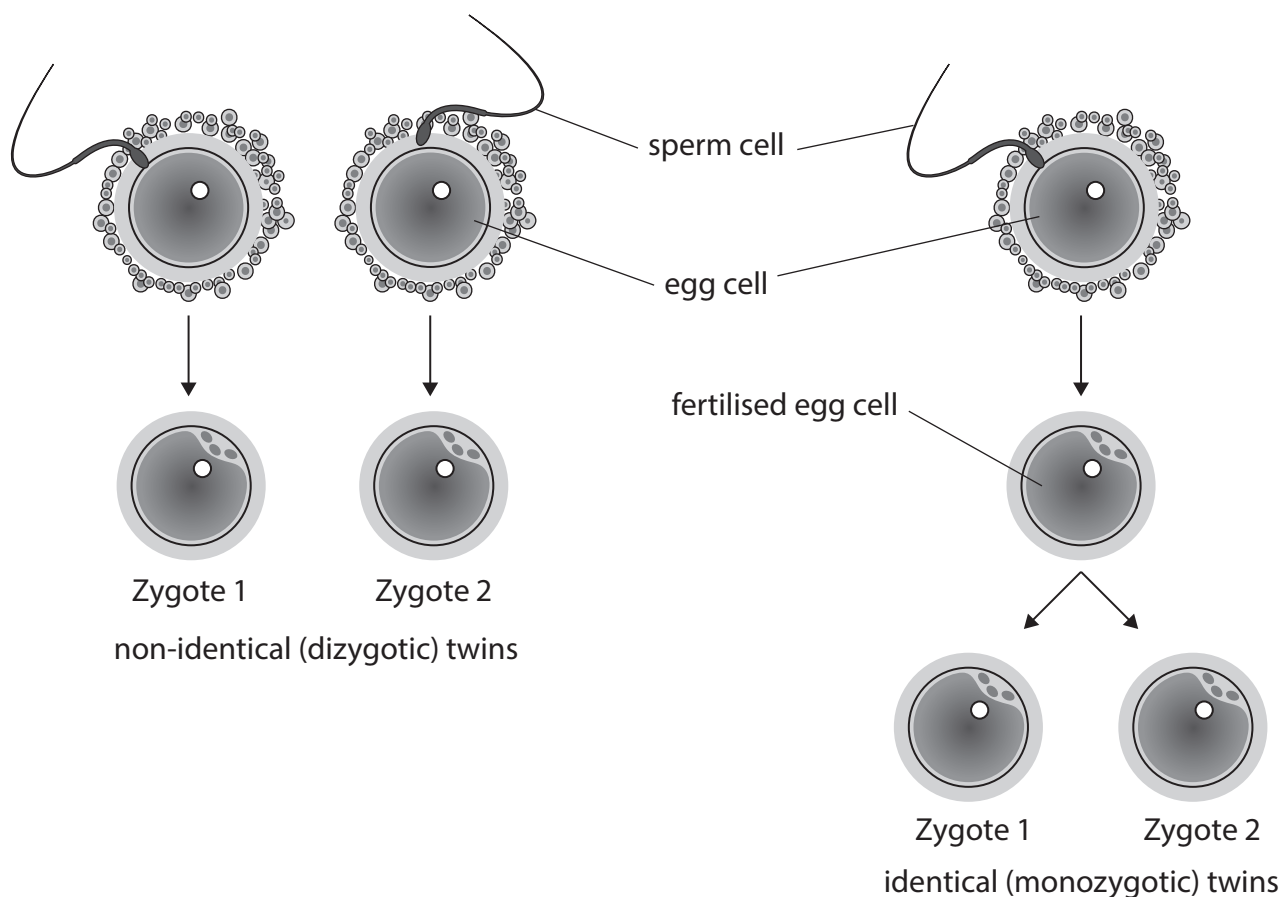
8 (a) (ii) Morulas, blastocysts and embryos can be sources of stem cells for use in medical therapies.

Describe how society uses scientific knowledge to make decisions about the use of stem cells in medical therapies.

(2)

- 8 (b) A twin pregnancy is when two embryos develop in the mother at the same time.

The diagram shows how two types of twins, non-identical (dizygotic) and identical (monozygotic), can occur.



A genome is all the genetic information in an organism.

Compare and contrast the genomes of the zygotes of dizygotic and monozygotic twins.

(3)

- 8 (c) Height in humans is an example of a polygenic characteristic.

Which statement is the correct description of a polygenic characteristic?

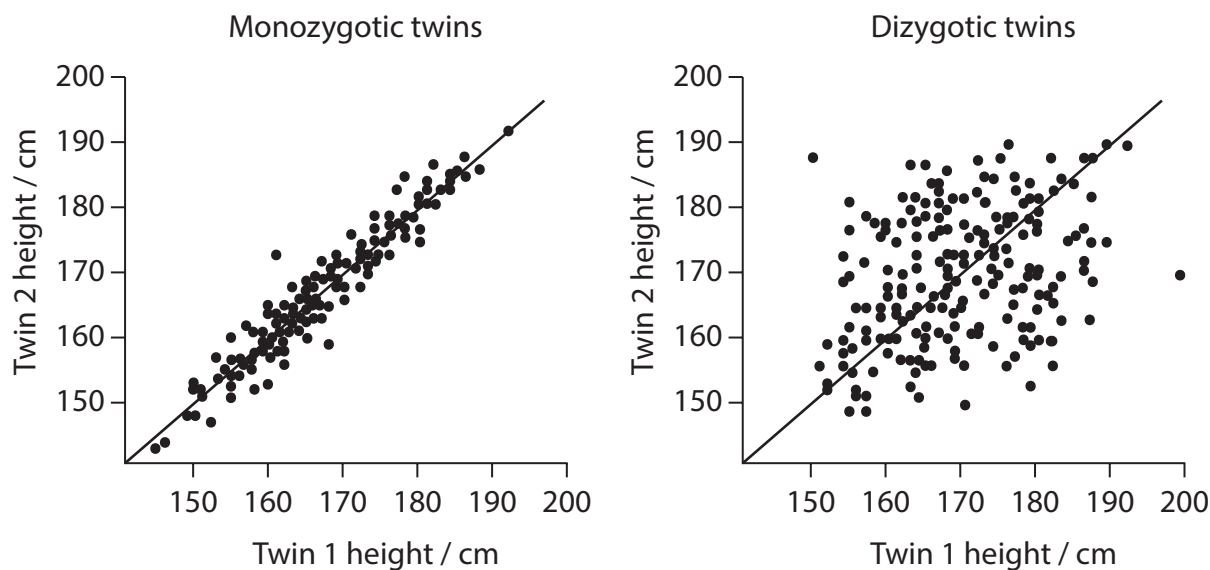
(1)

- A characteristic influenced by one allele at one locus
- B characteristic influenced by more than one allele at one locus
- C characteristic influenced by one gene at one locus
- D characteristic influenced by genes at multiple loci

- 8** (d) The adult heights of pairs of dizygotic and monozygotic twins were compared.

The oldest twin is Twin 1, and the younger twin is Twin 2.

The graphs show the results of this investigation.



- 8** (d) (i) State a suitable statistical test that could be used to analyse the data for monozygotic twins.

Give a reason for your answer.

(2)

- *8** (d) (ii) Discuss the effect of genotype and the environment on the height of these types of twins.

Use the information in the question and your own knowledge to support your answer.

(6)

(Total for Question 8 = 15 marks)

TOTAL FOR PAPER = 80 MARKS

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel International Advanced Level

Friday 15 May 2026

Afternoon (Time: 1 hour 30 minutes)

Paper reference **WBI12/01A**

Biology

UNIT 2: Cells, Development, Biodiversity and Conservation
International Advanced Subsidiary/Advanced Level
Answer Book

You must have:
 Question paper (sent separately)
 Scientific 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.*
- **Show all your working out** in calculations and **include units** where appropriate.

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.*
- In the question labelled 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 ►

P87920A

©2026 Pearson Education Ltd.
P:1/1/1/1/1/




Pearson

Answer ALL questions in the Answer Book.

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)

(1)

☐ A

☐ B

☐ C

☐ D

1 (b)

(2)

Prediction

Reason

1 (c)

(2)



DO NOT WRITE IN THIS AREA

(2)

(Total for Question 1 = 7 marks)



2 (a)

(1)

2 (b) (i)

(1)

1

2

2 (b) (ii)

(2)

Similarity

.....

.....

.....

Difference

.....

.....

.....

2 (b)(iii)

(2)

.....

.....

.....

.....

.....

.....



2 (c) (i)

(1)

2 (c) (ii)

(1)

☐ A

☐ B

☐ C

☐ D

(Total for Question 2 = 8 marks)



3 (a) (i)

(1)

3 (a) (ii)

(1)

☐ A

☐ B

☐ C

☐ D

3 (a) (iii)

(1)

3 (b) (i)

(1)

☐ A

☐ B

☐ C

☐ D

3 (b) (ii)

(1)



DO NOT WRITE IN THIS AREA

[illegible]

4 (a)**(1)****4 (b)****(2)****1****2****4 (c)****(3)**

DO NOT WRITE IN THIS AREA

[illegible]

5 (a)

(1)

- ☐ A
- ☐ B
- ☐ C
- ☐ D

5 (b) (i)

(1)

- ☐ A
- ☐ B
- ☐ C
- ☐ D

5 (b) (ii)

(1)

5 (c) (i)

(1)



DO NOT WRITE IN THIS AREA

5 (c) (ii)

(4)

Handwriting practice area with 18 horizontal dotted lines.

(Total for Question 5 = 8 marks)

Blank area for the answer to Question 5.



6 (a)

(2)

6 (b) (i)

(3)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

(2)

(4)

(Total for Question 6 = 11 marks)



7 (a) (i)

(2)

Answer

7 (a) (ii)

(2)

.....

.....

.....

.....

.....

.....

7 (a) (iii)

(2)

Answer



7 (b) (i)

(2)

Answer

7 (b) (ii)

(2)

.....

.....

.....

.....

.....

.....



7 (c)

(4)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 7 = 14 marks)



8 (a) (i)

(1)

- ☐ A
- ☐ B
- ☐ C
- ☐ D

8 (a) (ii)

(2)

8 (b)

(3)



8 (c)

(1)

☐ A

☐ B

☐ C

☐ D

8 (d) (i)

(2)

Test

Reason



DO NOT WRITE IN THIS AREA

*8 (d) (ii)

(6)

Handwriting practice area with 20 horizontal dotted lines.

(Total for Question 8 = 15 marks)

TOTAL FOR PAPER = 80 MARKS



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

