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CAMBRIDGE
International Education

Cambridge International AS & A Level

BIOLOGY **9700/12**

Paper 1 Multiple Choice **May/June 2026**

1 hour 15 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

0513601275

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.

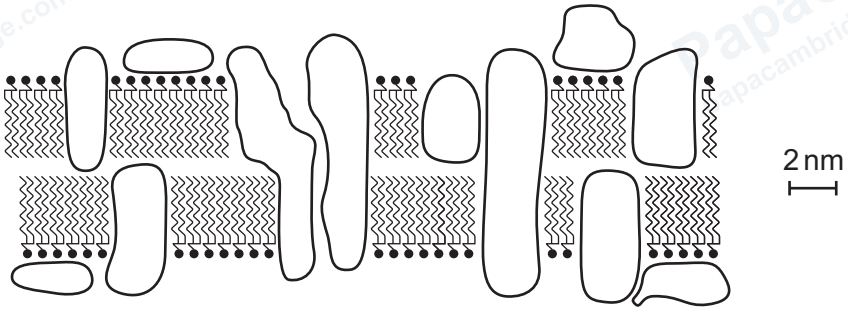
This document has **20** pages. Any blank pages are indicated.

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1 The diagram shows part of a membrane in a plant cell.



What is the width of the membrane?

A 7.5×10^{-3} m

B 7.5×10^{-6} m

C 7.5×10^{-9} m

D 7.5×10^{-12} m

2 A student used a light microscope to observe a cell and was able to distinguish between two cell structures that were 0.05 mm apart.

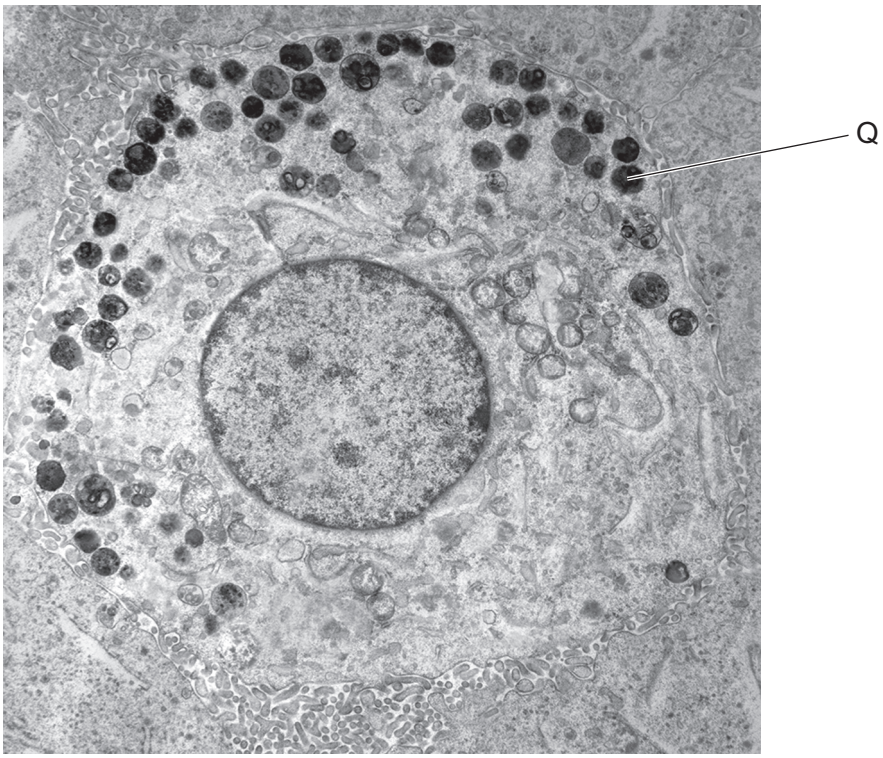
The student then wanted to distinguish between two other structures that were 75 μm apart with this microscope.

Which row is correct for this microscope when viewing this cell?

	term that defines the level of detail in an image	**can distinguish between two cell structures 75 μm apart**
A	magnification	no
B	magnification	yes
C	resolution	no
D	resolution	yes

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3 The transmission electron micrograph shows a macrophage.



The dark stained material in the structure labelled Q is solid material from pathogens.

What is the name of organelle Q?

A Golgi apparatus

B lysosome

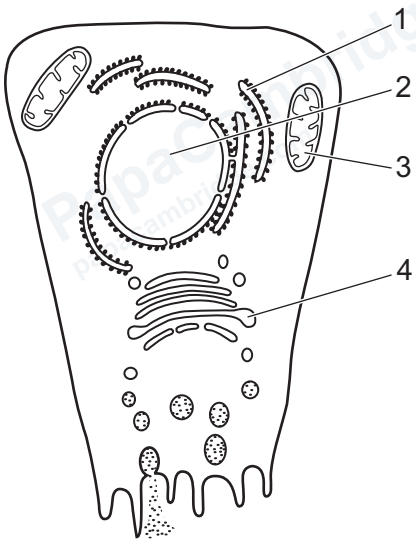
C ribosome

D mitochondrion

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4 A cell was put in a dish with radioactively labelled nucleotides. These nucleotides entered the cell by facilitated diffusion.



In which cell structures did the radioactivity first become concentrated?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

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5 Which table about the cell structures present in typical animal cells and typical plant cells is correct?

A

cell structures	present in animal cells	present in plant cells
centriole	✓	✓
chloroplast	✗	✓
Golgi body	✓	✓
plasmodesmata	✗	✓

B

cell structures	present in animal cells	present in plant cells
centriole	✓	✗
chloroplast	✗	✓
Golgi body	✓	✓
plasmodesmata	✗	✓

C

cell structures	present in animal cells	present in plant cells
centriole	✓	✗
chloroplast	✗	✓
Golgi body	✓	✓
plasmodesmata	✓	✓

D

cell structures	present in animal cells	present in plant cells
centriole	✗	✓
chloroplast	✓	✓
Golgi body	✗	✓
plasmodesmata	✓	✓

key

✓ = present

✗ = **not** present

6 What is present in eukaryotic cells **and** is also present in prokaryotic cells?

A centrioles

B circular DNA

C lysosomes

D nucleoli

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7 A type of disaccharide produced from the breakdown of starch is composed of two molecules of α-glucose.

Which row describes the results of the tests for this disaccharide?

	heat disaccharide solution with Benedict's solution	**heat disaccharide solution with acid, neutralise, and then heat with Benedict's solution**
A	red precipitate forms	red precipitate forms
B	red precipitate forms	solution remains blue
C	solution remains blue	red precipitate forms
D	solution remains blue	solution remains blue

8 What is the general formula for starch?

A $(C_5H_{10}O_5)_n$ **B** $(C_5H_{10}O_6)_n$ **C** $(C_6H_{12}O_6)_n$ **D** $(C_6H_{10}O_5)_n$

9 What is the advantage of covalent bonds when joining smaller molecules together to form polymers?

A They are strong and stable.

B They are involved in the cohesion of dipolar molecules.

C They generate two oppositely charged ions.

D They are broken easily in hydrolysis reactions.

10 X and Y are two molecules of amylose.

- Amylose molecule X is made from a chain of 700 glucose monomers.
- Amylose molecule Y is made from a chain of 300 glucose monomers.

How many water molecules are needed to hydrolyse molecule X completely into glucose monomers and molecule Y completely into maltose?

A 850 **B** 848 **C** 650 **D** 648

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11 Which statement describes a correct comparison of the structure of a triglyceride molecule with a phospholipid molecule?

A A glycerol molecule is one of the components needed to synthesise a triglyceride molecule, but it is **not** one of the components needed to synthesise a phospholipid molecule.

B Triglyceride molecules and phospholipid molecules have a hydrophilic component and a hydrophobic component.

C The fatty acids in a triglyceride molecule can be saturated or unsaturated, whereas the fatty acids in a phospholipid molecule are always saturated.

D There are three ester bonds in a triglyceride molecule, whereas there are only two ester bonds in a phospholipid molecule.

12 Follicle-stimulating hormone (FSH) is a protein that regulates reproductive processes in the body.

FSH has primary, secondary, tertiary and quaternary structures.

Which statement only describes part of the tertiary structure of FSH protein and **not** one of the other levels of protein structure?

A The α-subunit of FSH contains disulfide bonds.

B The β-subunit of FSH contains an α-helix.

C FSH is composed of two polypeptide subunits, α and β.

D Carbohydrate molecules are attached to asparagine amino acids in FSH.

13 Which statements about the structure of haemoglobin are correct?

1 A haemoglobin molecule has a spherical structure and amino acids with hydrophilic R-groups that are found near the centre of the molecule.

2 Hydrogen bonds that form between the –NH group of one amino acid and the –C=O group of another amino acid stabilise the tertiary structure.

3 The tertiary structure of a haemoglobin molecule changes when an oxygen molecule binds to the haem group.

A 1 and 2 **B** 1 only **C** 2 and 3 **D** 3 only

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14 Which row about the roles of water is correct?

	reaction that requires water as a reactant	reason that the high specific heat capacity of water is useful to organisms
A	action of amylase	it removes lots of heat energy when it evaporates
B	action of DNA polymerase	it needs a lot of heat energy to increase its temperature
C	action of amylase	it needs a lot of heat energy to increase its temperature
D	action of DNA polymerase	it removes lots of heat energy when it evaporates

15 A mutation occurred within the DNA sequence coding for an enzyme, causing a decrease in the rate of a reaction catalysed by this mutated enzyme.

Which statements could explain the decrease in the rate of reaction?

1 An inhibitor for this enzyme has an increased affinity for the enzyme and forms an enzyme–inhibitor complex more easily.

2 The active site of the enzyme might have changed shape and so is less complementary.

3 The activation energy for the reaction with the mutated enzyme is greater than with the non-mutated enzyme.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

16 The human immunodeficiency virus produces a long polypeptide that is hydrolysed by a protease enzyme, producing several smaller peptides. This viral protease is the target of anti-AIDS drugs.

Which feature is essential for the success of these drugs?

A a complex structure that inhibits many types of viral enzyme

B a molecule containing a heavy metal atom that is a non-competitive inhibitor of enzymes

C a protein that can act as a competitive inhibitor of protease enzymes

D a specific structure that inhibits only viral protease

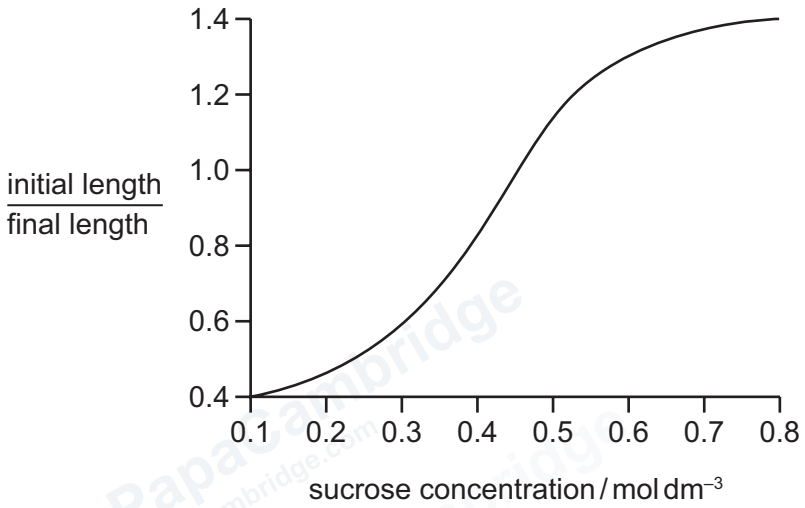
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17 Which row describes the positions of molecules in cell surface membranes?

	only on the surface of cell membranes	extending into cell membranes	between the phospholipid tails of cell membranes
A	cholesterol and glycolipids	glycoproteins	cholesterol
B	phospholipids	cholesterol and glycolipids	glycoproteins
C	glycolipids and glycoproteins	phospholipids	cholesterol
D	glycoproteins only	cholesterol only	glycolipids

18 Strips of plant tissue were immersed in a range of sucrose solutions of different concentrations. Their lengths were measured before immersion and after 30 minutes.

The graph shows the ratio of initial length to final length.



What is a correct description of the change in the cells and in the water potential of the cells, as the sucrose concentration increases?

	change in the cells	change in the water potential in the cells
A	less turgid	more negative
B	less turgid	less negative
C	more turgid	less negative
D	more turgid	more negative

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19 Some molecules are too large to enter a cell through the proteins in its cell surface membrane.

Which process allows these molecules to enter the cell?

A active transport

B endocytosis

C exocytosis

D facilitated diffusion

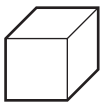
20 Some agar was coloured pink using a pH indicator and used to make four agar blocks with different dimensions.

The four agar blocks were placed in a beaker and covered with 1.0 mol dm^{-3} hydrochloric acid at a temperature of 20 °C.

The hydrochloric acid diffused into the agar blocks causing the blocks to become colourless.

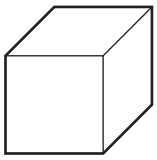
Which diagram correctly identifies the agar block that became colourless in the longest amount of time?

A



10 mm × 10 mm × 10 mm

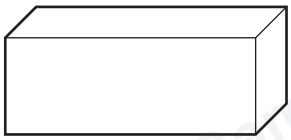
B



20 mm × 20 mm × 20 mm

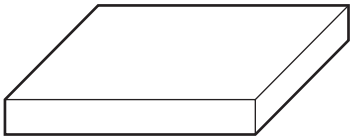
NOT TO SCALE

C



40 mm × 20 mm × 10 mm

D

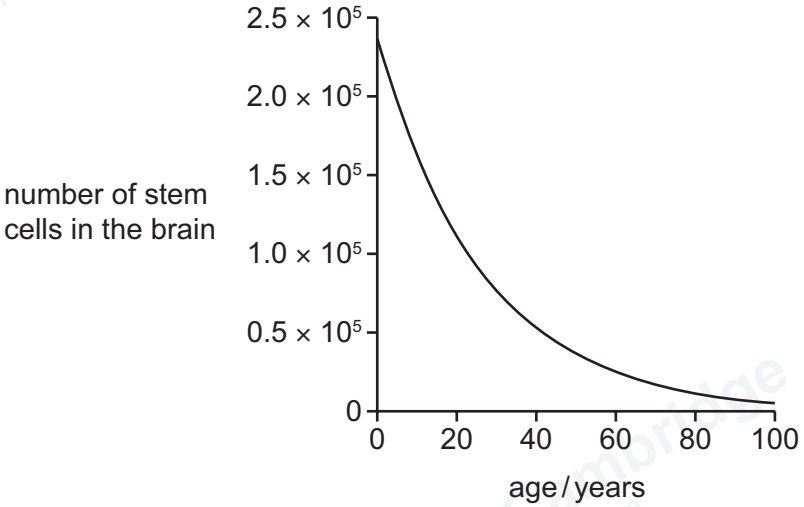


40 mm × 40 mm × 5 mm

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21 The graph shows how the number of stem cells in the brain changes as a person ages.



Which events will decrease in the brain due to the change in the number of stem cells as a person ages?

A cell repair and mitosis only

B mitosis and cell replacement only

C mitosis, cell replacement and tissue repair only

D cell repair, mitosis, cell replacement and tissue repair

22 A group of chemicals used to treat cancer prevents the formation of the spindle during mitosis.

Which phase of mitosis is the first to be affected?

A anaphase

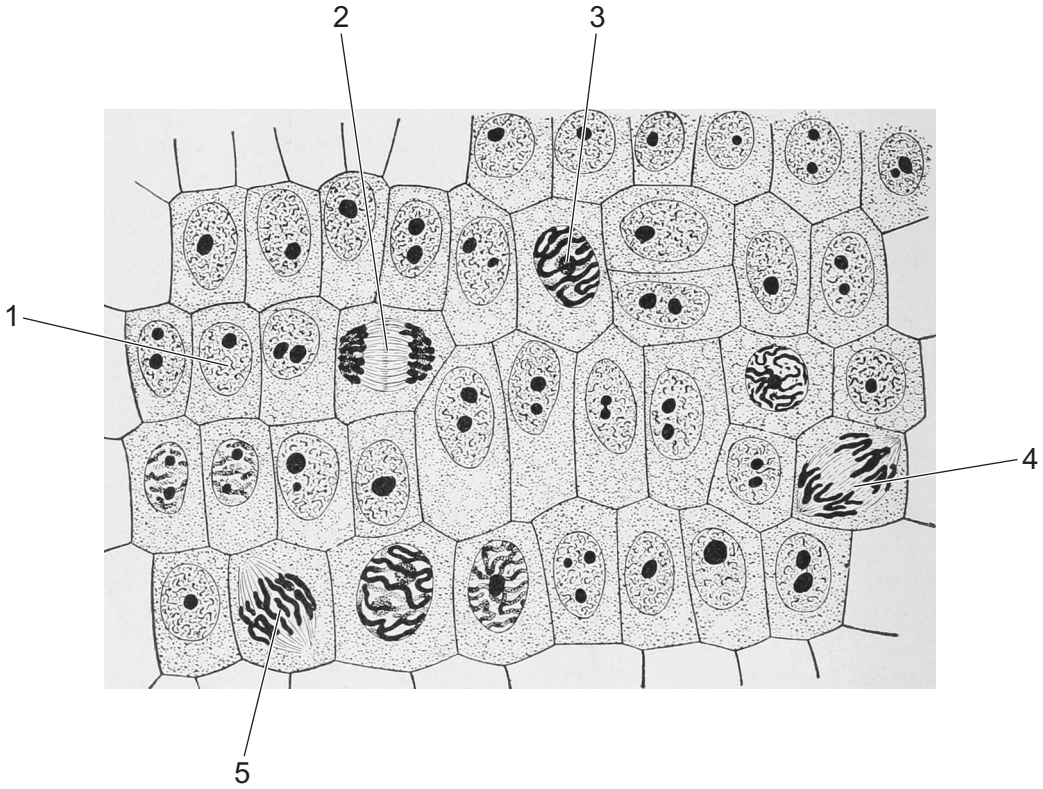
B metaphase

C prophase

D telophase

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23 Some plant cells in different stages of the mitotic cell cycle are labelled.



What is the correct order of one mitotic cell cycle?

A $3 \rightarrow 4 \rightarrow 5 \rightarrow 2 \rightarrow 1$

B $1 \rightarrow 3 \rightarrow 5 \rightarrow 4 \rightarrow 2$

C $3 \rightarrow 4 \rightarrow 2 \rightarrow 5 \rightarrow 1$

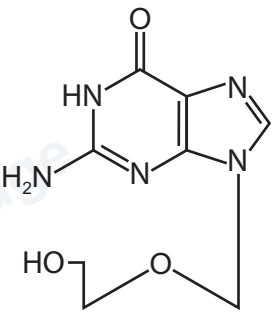
D $1 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 2$

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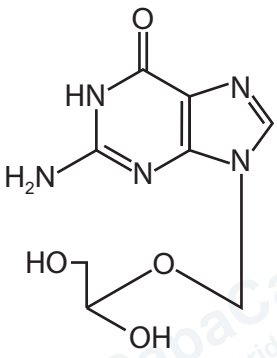
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24 The diagram shows the structures of some drugs that have a similar structure to nucleotides. The presence of these drugs reduces nucleic acid synthesis.

acyclovir



gancyclovir



Which statement explains how these drugs reduce nucleic acid synthesis?

A They prevent peptide bonds forming between amino acids.

B They are non-competitive inhibitors of the enzymes that catalyse the synthesis of DNA or RNA.

C They bind to pyrimidine nucleotides and the base pair is the wrong size.

D They replace purine nucleotides, causing the synthesis of incomplete nucleic acids.

25 In cancer cells, the production of DNA ligase is upregulated, meaning it is produced in larger quantities than in a normal cell.

Several potential anticancer drugs are being designed as inhibitors to this enzyme as a mechanism for preventing DNA replication in cancerous cells.

How does the inhibition of DNA ligase prevent successful DNA replication in cancerous cells?

A Free nucleotides would be unable to form any phosphodiester bonds with adjacent nucleotides while forming the lagging strand.

B Hydrogen bonds between the nucleotide bases within the leading strand would **not** form, preventing complementary base pairing between the DNA strands.

C Short strands of DNA would **not** be successfully incorporated into the continuous sugar phosphate backbone of the leading strand.

D Condensation reactions between some nucleotides on the lagging strand would **not** be catalysed, preventing the nucleotides linking together.

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26 Which statement describes post-transcriptional RNA modification?

A The mRNA is modified by removal of exons and joining of introns to form the primary transcript.

B The mRNA is modified by removal of introns and joining of exons to form the primary transcript.

C The primary transcript is modified by removal of introns and joining of exons to form the mRNA.

D The primary transcript is modified by removal of exons and joining of introns to form the mRNA.

27 Which types of mutation in the coding region of a gene always result in a change in the primary structure of a polypeptide chain?

	deletion	insertion	substitution
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = mutation **always** results in a change in the primary structure of a polypeptide

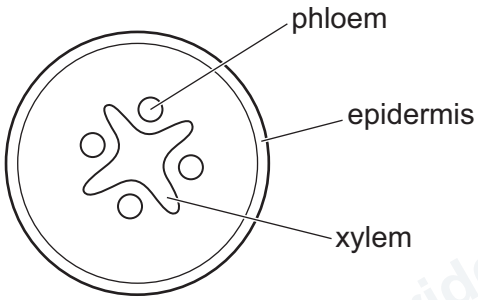
✗ = mutation might **not** result in a change in the primary structure of a polypeptide

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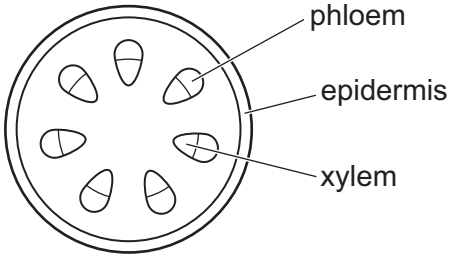
28 The diagrams show plan diagrams of plant tissues.

Which plan diagram shows a transverse section through a dicotyledenous stem?

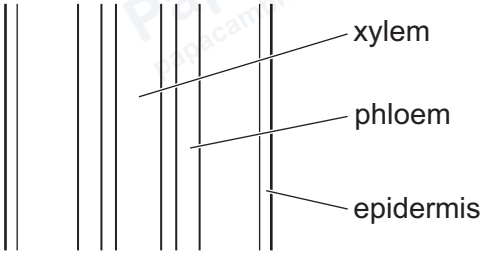
A



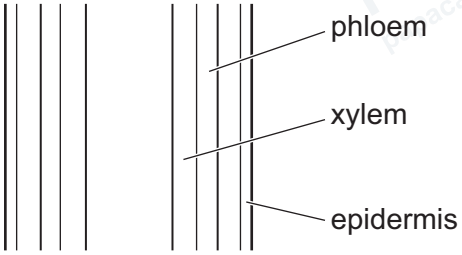
B



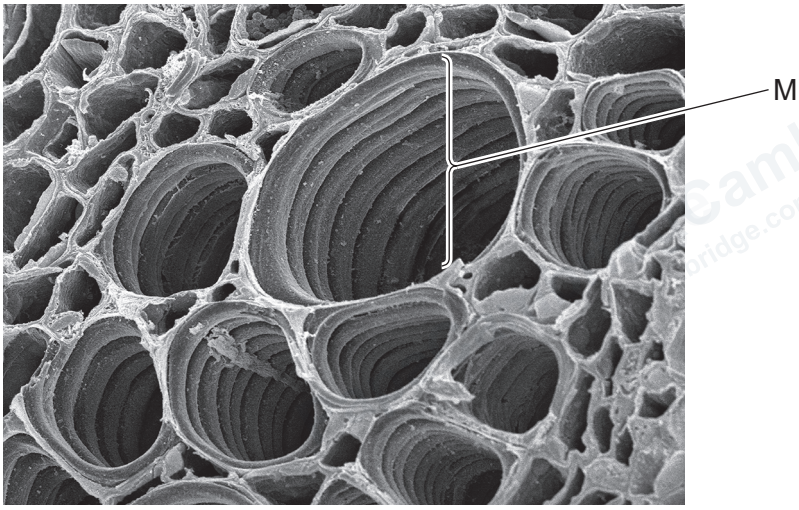
C



D



29 The electron micrograph shows part of a leaf.



What is a function of structure M?

A transport of mineral ions

B gas exchange

C storage of carbohydrates

D transfer of assimilates

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30 Which terms describe the method by which water is transported within xylem vessel elements?

1 mass flow

2 cohesion–tension

3 osmosis

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

31 Which statement about the pulmonary artery is correct?

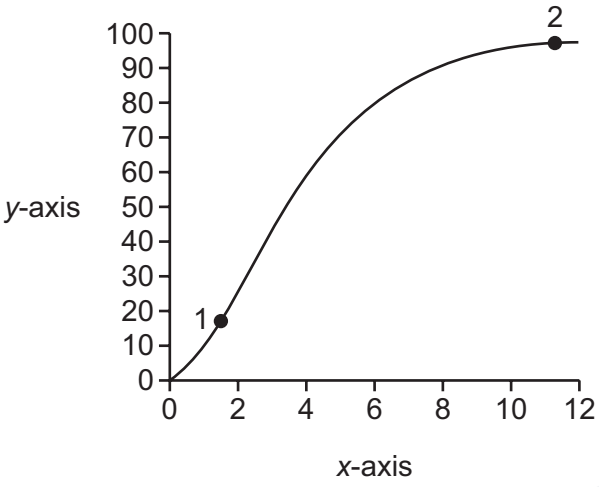
A It contains a series of valves.

B It contains blood with a higher concentration of oxygen than in the pulmonary vein.

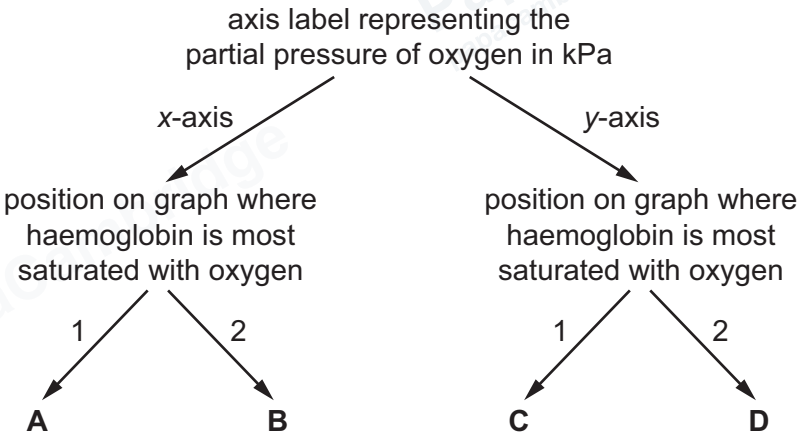
C It contains blood moving towards the heart.

D It contains blood at a higher pressure than in the pulmonary vein.

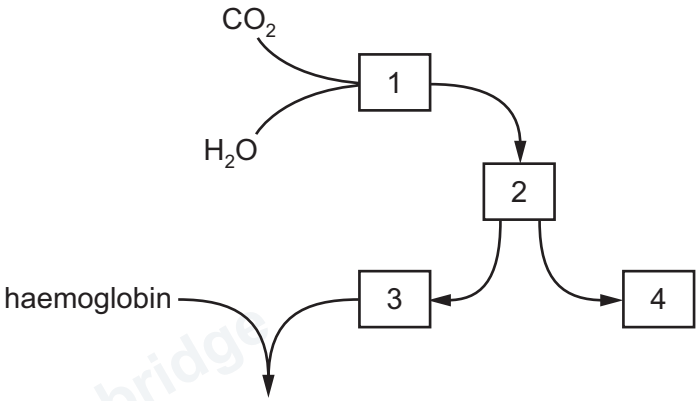
32 The graph shows the oxygen dissociation curve for adult human haemoglobin.



What is correct for this dissociation curve?



33 The diagram shows the pathway for the transport of carbon dioxide that occurs in red blood cells.



Which row is correct?

	1	2	3	4
A	carbonic anhydrase	carbonic acid	hydrogen ions	hydrogencarbonate ions
B	carbaminohaemoglobin	haemoglobinic acid	hydrogen ions	hydrogencarbonate ions
C	carbaminohaemoglobin	carbonic anhydrase	carbonic acid	carbon dioxide
D	haemoglobinic acid	carbonic acid	hydrogencarbonate ions	hydrogen ions

34 The thickness of the cardiac muscle in the chambers of the human heart was measured.

Chamber W had the thickest muscle, chamber X had thinner muscle than W, and chambers Y and Z had muscle of the same thickness as each other.

What is the correct order in which these chambers will contract during the cardiac cycle?

A Chambers W and X contract together, and then chambers Y and Z contract together.

B Chambers X and Y contract together, and then chambers W and Z contract together.

C Chambers X and Z contract together, and then chamber W contracts, then chamber Y contracts.

D Chambers Y and Z contract together, and then chamber W contracts, then chamber X contracts.

35 How many phospholipid bilayers does an oxygen molecule pass through in diffusing from an alveolar air space to form oxyhaemoglobin in a red blood cell in a mammalian lung?

(Assume that there are no pores between the cells the oxygen molecules must pass through.)

A 3 **B** 5 **C** 6 **D** 9

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36 What is a function of squamous epithelial cells in the gas exchange system?

A opening the bronchi wider to allow more air into the alveoli

B producing mucus to trap pathogens in the trachea

C acting as a thin barrier between the air and the blood

D removing dust and pathogens from the bronchi

37 Which statements about tuberculosis (TB) are correct?

1 A person who has had the TB vaccine will make B-lymphocytes that are specific to TB.

2 People who are malnourished are more vulnerable to TB infections.

3 TB is caused by a protoctist and primarily infects the bones, intestines and lymph nodes.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

38 Which row gives one correct example of a cause, a consequence and a step to reduce the impact of antibiotic resistance?

	cause	consequence	step to reduce impact
A	routine use of the same antibiotic for the same infection	higher average costs of treating bacterial infections	testing pathogen sensitivity before prescribing antibiotics
B	routine treatment of healthy livestock with antibiotics	increasing death rate from bacterial infections	increase use of antibiotics across a broad range of diseases
C	vaccination programmes targeting bacterial infections	longer average treatment and recovery time from bacterial infection	carry out research to identify new antibiotics
D	antibiotics used to treat viral infections	reduced activity of phagocytes in response to bacterial infection	ban the use of antibiotics which are used to raise growth rates in animals

39 Which type of blood cell produces memory cells?

A phagocytes

B neutrophils

C macrophages

D lymphocytes

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40 What describes natural passive immunity?

A protection against a pathogen by an injection of antibodies

B protection against a pathogen by drinking breast milk containing antibodies

C stimulation of lymphocytes by antigens contained in a vaccine

D stimulation of lymphocytes by antigens on the surface of invading pathogens

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