CAMBRIDGE
International Education

Cambridge International AS & A Level

BIOLOGY **9700/14**

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)

5703207927

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.

1 A student prepares some cells of onion plant tissue to be viewed with a light microscope.

Which method should the student use to prepare the onion plant tissue?

A place a layer of onion epidermal cells on a microscope slide → add a stain to the slide → adjust the magnification → place a cover slip on the stained tissue

B place several layers of onion epidermal cells on a microscope slide → add a stain to the slide → place the cover slip on the stained tissue → adjust the magnification

C place a layer of onion epidermal cells on the microscope slide → add a stain to the slide → place a cover slip on the stained tissue → adjust the magnification

D place a layer of onion epidermal cells on the microscope slide → add a stain to the top of a cover slip → place the cover slip on the tissue → adjust the magnification

2 Which range of sizes would include most eukaryotic cells?

A 1×10^{2} nm to 1 μm

B 1 μm to 1×10^{1} μm

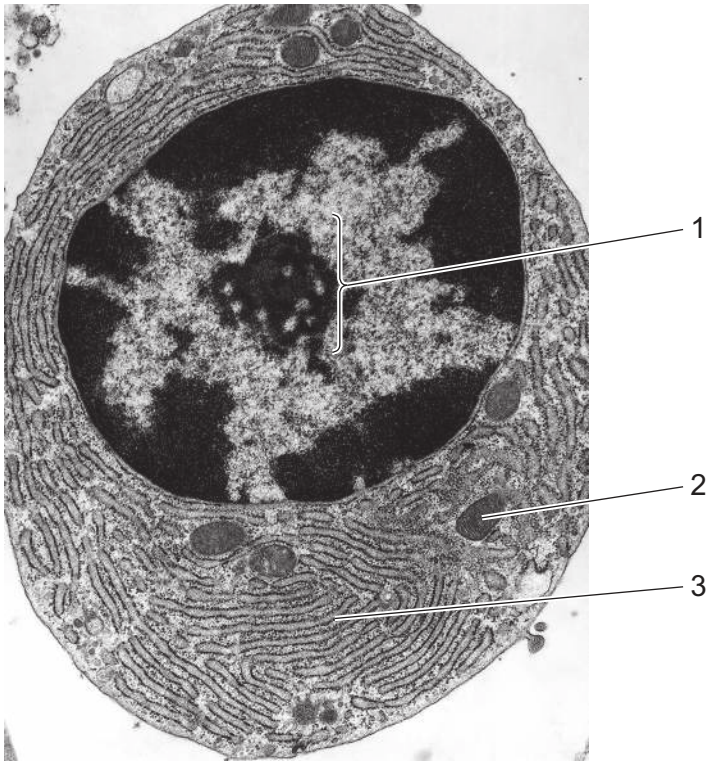
C 1×10^{1} μm to 1×10^{2} μm

D 1×10^{-3} mm to 1×10^{-2} mm

3 Which eyepiece and objective lens combination of a light microscope allows the greatest number of cells in a field of view to be seen?

	eyepiece lens	**objective lens**
A	×5	×10
B	×5	×40
C	×10	×10
D	×10	×40

4 The electron micrograph shows a cell.



Which row correctly identifies the structures labelled 1, 2 and 3?

	1	2	3
A	nucleolus	mitochondrion	rough endoplasmic reticulum
B	centriole	chloroplast	rough endoplasmic reticulum
C	nucleolus	chloroplast	Golgi body
D	centriole	mitochondrion	Golgi body

5 An amino acid enters a cell and is then used to synthesise an enzyme secreted by the cell.

What is the sequence of cell structures involved in the synthesis of the enzyme?

	first →			**last**
A	rough endoplasmic reticulum	Golgi body	ribosome	exocytotic vesicle
B	rough endoplasmic reticulum	ribosome	Golgi body	cell surface membrane
C	ribosome	rough endoplasmic reticulum	Golgi body	exocytotic vesicle
D	ribosome	Golgi body	rough endoplasmic reticulum	cell surface membrane

6 A scientist isolated cells from a sample of soil. The cells were studied using an electron microscope. The scientist concluded that the cells were a mixture of eukaryotic cells and bacterial cells.

Which features would distinguish a cell in the mixture as being a bacterial cell rather than a eukaryotic cell?

1 cell wall

2 cells are 1.5 μm in diameter

3 ribosomes free in the cytoplasm

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

7 Solution Q contains one or more biological molecules. An enzyme solution containing lipase, which is an enzyme that breaks down lipids, and amylase was mixed with solution Q to form solution R. Solution R was left for 15 minutes.

Samples of solution R were then tested for the presence of biological molecules and produced the results shown.

test	result
iodine	orange
biuret	purple
emulsion	clear
Benedict's	red

Some possible combinations of biological molecules in solution Q are listed.

1 starch only

2 proteins, lipids and glucose only

3 lipids and starch only

4 proteins and starch only

Which possible combinations of the listed biological molecules could have been present in solution Q?

A 1, 2, 3 and 4

B 1 and 3 only

C 2, 3 and 4 only

D 2 and 4 only

8 Which rows show the chemical groups present in the biological molecules listed?

	biological molecule	presence of carboxyl (COOH) groups	presence of two or more hydroxyl (OH) groups
1	β-glucose	no	yes
2	glycerol	no	no
3	fatty acid	yes	no

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

9 Which bonds hold the cellulose molecules next to each other in a plant cell wall?

A glycosidic

B hydrogen

C ionic

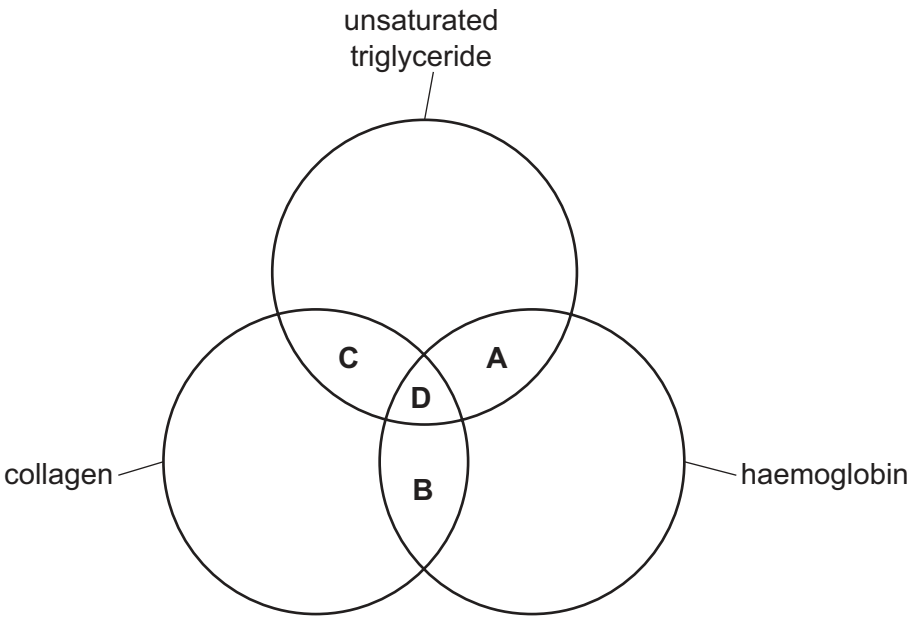
D peptide

10 Phosphatidylglycerol is a saturated phospholipid with an additional group $–CH_2–CH(OH)–CH_2(OH)$ attached to the phosphate group.

Which row correctly identifies the number of double covalent bonds at different locations in this phospholipid molecule?

	additional group	ester bonds	fatty acids
A	1	2	0
B	0	3	1
C	1	0	1
D	0	2	0

11 Which molecules always contain at least six double bonds?



12 What occurs during protein denaturation by extremes of pH?

1 breakage of peptide bonds leading to loss of shape of active site

2 disruption of existing ionic bonds between amino acid R-groups

3 loss of α-helical regular arrangement of amino acids

4 loss of protein tertiary structure resulting in loss of function

A 1, 2, 3 and 4

B 2, 3 and 4 only

C 1 and 3 only

D 2 and 4 only

13 What is a correct statement to explain how the structure of a molecule of haemoglobin binds to oxygen?

A Haemoglobin has four haem groups, each of which binds to one oxygen atom.

B Haemoglobin has four haem groups, each of which binds to one oxygen molecule.

C Haemoglobin has one haem group, which binds to four oxygen atoms.

D Haemoglobin has one haem group, which binds to four oxygen molecules.

14 What describes the induced fit mode of action of an enzyme?

A The binding of the active site to the substrate causes a permanent change to the enzyme shape.

B The substrate and active site have complementary shapes that form temporary bonds.

C The substrate causes a change in enzyme shape so that the substrate can bind to the active site.

D The substrate changes shape so it can bind to the active site.

15 Which measurement is used to investigate the progress of the reaction catalysed by catalase?

A the rate of breakdown of starch

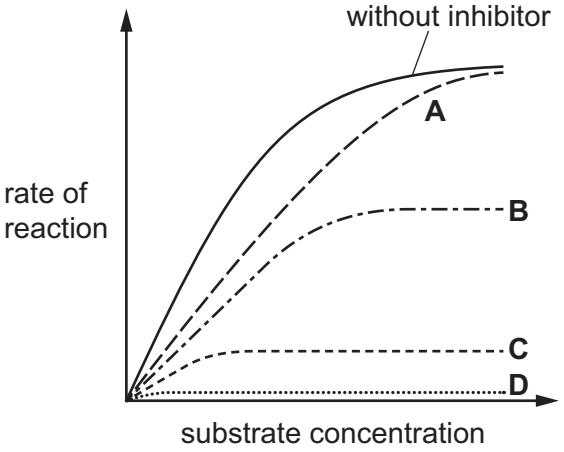
B the rate of breakdown of water

C the rate of formation of oxygen

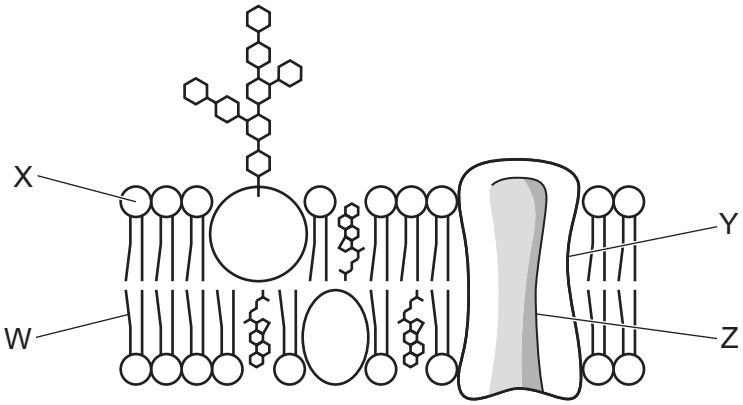
D the rate of formation of hydrogen peroxide

16 The graph shows the effect of substrate concentration on the rate of reaction of an enzyme without an inhibitor and with four different inhibitors.

Which curve shows the effect of a competitive inhibitor?



17 The diagram shows part of a cell surface membrane. Some regions of the structures found in the cell surface membrane have been labelled.



Which row is correct?

	hydrophilic	**hydrophobic**
A	W	Z
B	X	Y
C	Y	W
D	Z	X

18 What would result in increased fluidity of the cell surface membrane?

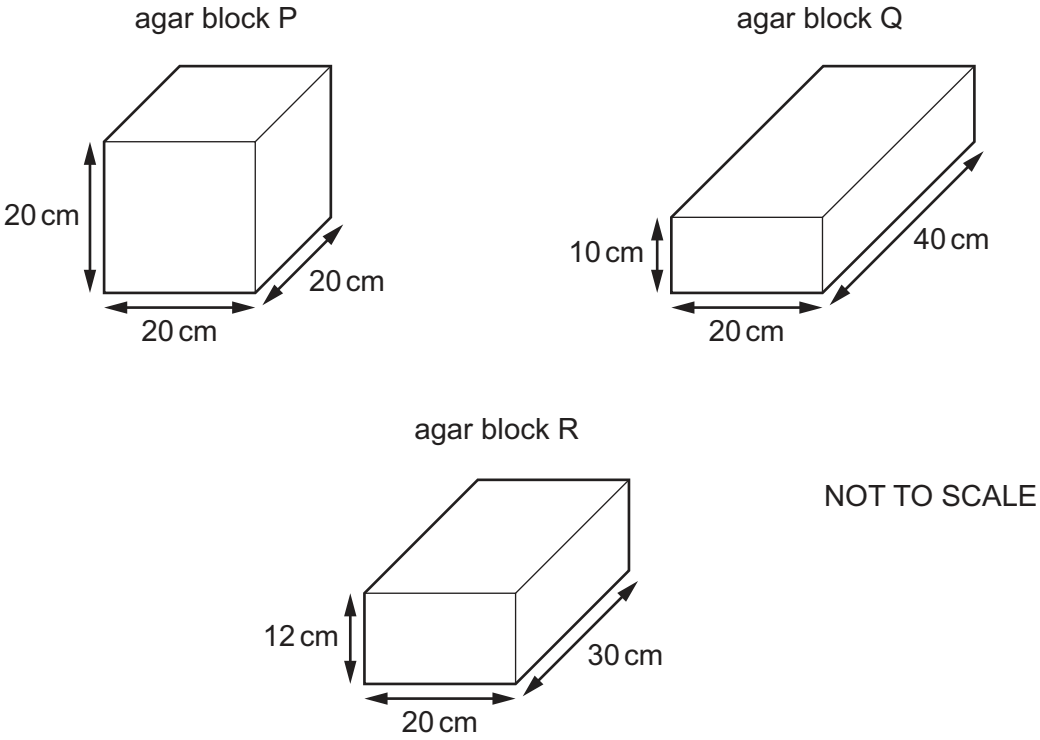
A increasing temperature

B decreasing temperature

C increasing the number of membrane saturated fatty acids

D decreasing pH

19 The diagram shows the measurements of agar blocks P, Q and R that contained dilute acid.



The agar blocks were placed into a pH indicator solution that diffused into the blocks. The agar changed colour when the indicator solution came into contact with the acid.

What is the correct order for the complete colour change of the agar blocks?

	fastest ⟶		**slowest**
A	P	Q	R
B	P	R	Q
C	Q	R	P
D	R	P	Q

20 What is a correct description of part of a chromosome?

A Introns are coding sequences of DNA in a chromosome.

B Histone proteins wrap around the outside of a chromosome.

C A centromere joins a pair of non-sister chromatids during cell division.

D Telomeres are repetitive non-coding sequences of DNA in a chromosome.

21 Four students wrote descriptions to explain how a single cell can form a tumour.

Which description is a possible way that a single cell can form a tumour?

A

a mutation occurs in a gene that controls the cell cycle

↓

G_2 phase of the cell cycle ends, and M phase begins

↓

the duration of interphase increases

B

a mutation occurs in a gene that controls the cell cycle

↓

G_2 phase of the cell cycle ends, and M phase begins

↓

the duration of interphase decreases

C

a mutation occurs in a gene that controls the cell cycle

↓

the cell cycle stops when the cell is in G_2 phase

↓

the duration of interphase increases

D

a mutation occurs in a gene that controls the cell cycle

↓

the cell cycle stops when the cell is in G_2 phase

↓

the duration of interphase decreases

22 Which stage in mitosis occurs immediately before the cytoplasm completely divides?

A anaphase

B metaphase

C prophase

D telophase

23 What is found in DNA, RNA and also ATP molecules?

A phosphate groups joined to pentose sugars by phosphodiester bonds

B nucleotides with the nitrogen-containing base adenine

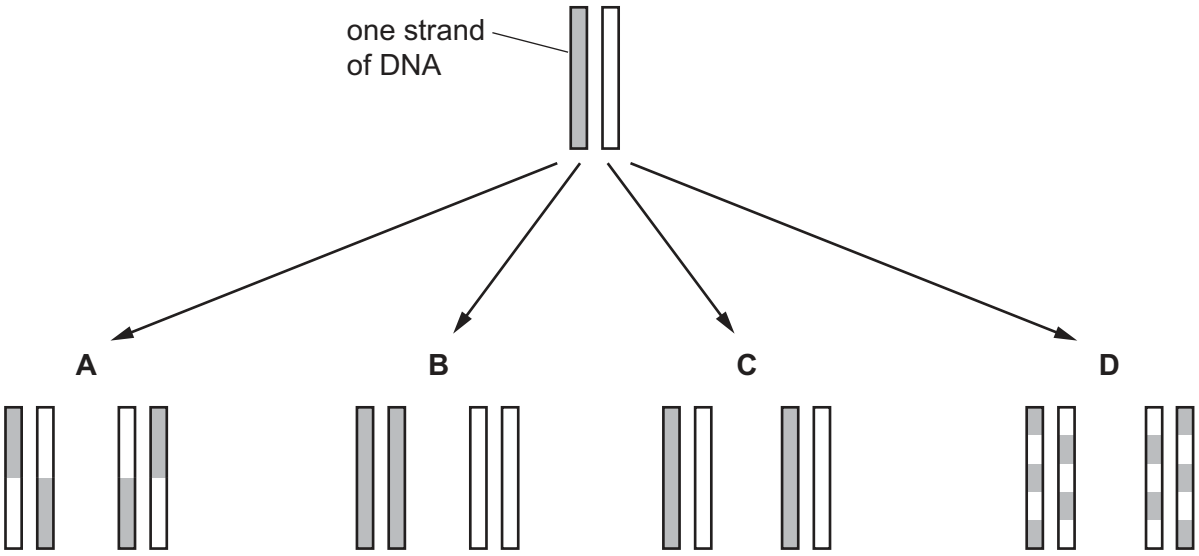
C hydrogen bonding between complementary nitrogen-containing bases

D a chain of nucleotides, joined together by condensation reactions

24 Which row correctly identifies each base as purine or pyrimidine?

	cytosine	thymine	guanine
A	purine	purine	pyrimidine
B	purine	pyrimidine	pyrimidine
C	pyrimidine	purine	purine
D	pyrimidine	pyrimidine	purine

25 Which diagram shows the correct organisation of DNA molecules after one replication?



26 The diagram shows the nucleotide sequence of a small section of a gene which is transcribed.

GCAGCATGCGCG

The table shows the amino acids coded for by 10 mRNA codons.

mRNA codon	amino acid
AAG	Lys
ACG	Thr
CGG CGC CGU	Arg
CCG	Pro
GCC GCG	Ala
GGC	Gly
UGC	Cys

What is the order of the four amino acids in the polypeptide translated from this small section of a gene?

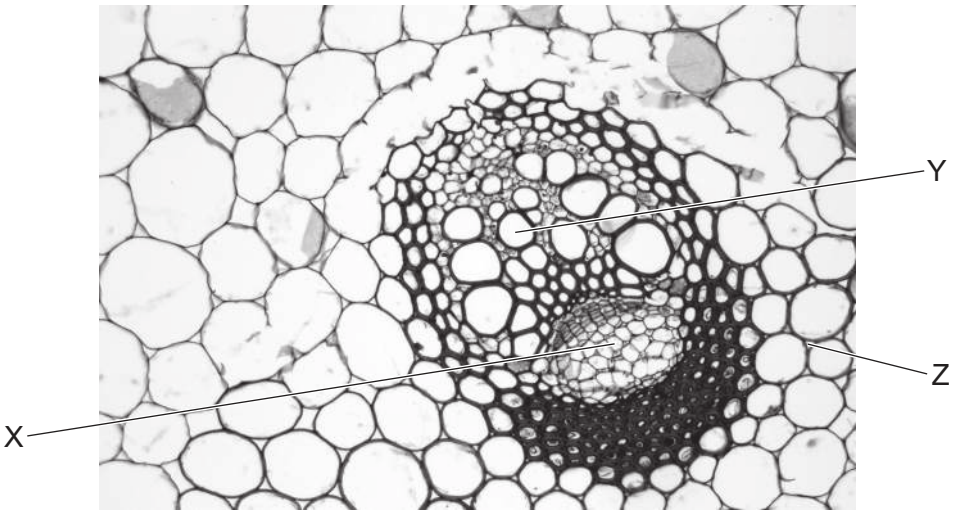
A Ala-Ala-Cys-Ala

B Ala-Arg-Gly-Ala

C Arg-Ala-Pro-Arg

D Arg-Arg-Thr-Arg

27 The photomicrograph shows a vascular bundle from the stem of a plant.



What are the correct labels for structures X, Y and Z?

	X	Y	Z
A	companion cell	phloem sieve tube element	air space
B	phloem sieve tube element	xylem vessel element	air space
C	xylem vessel element	companion cell	phloem sieve tube element
D	xylem vessel element	phloem sieve tube element	companion cell

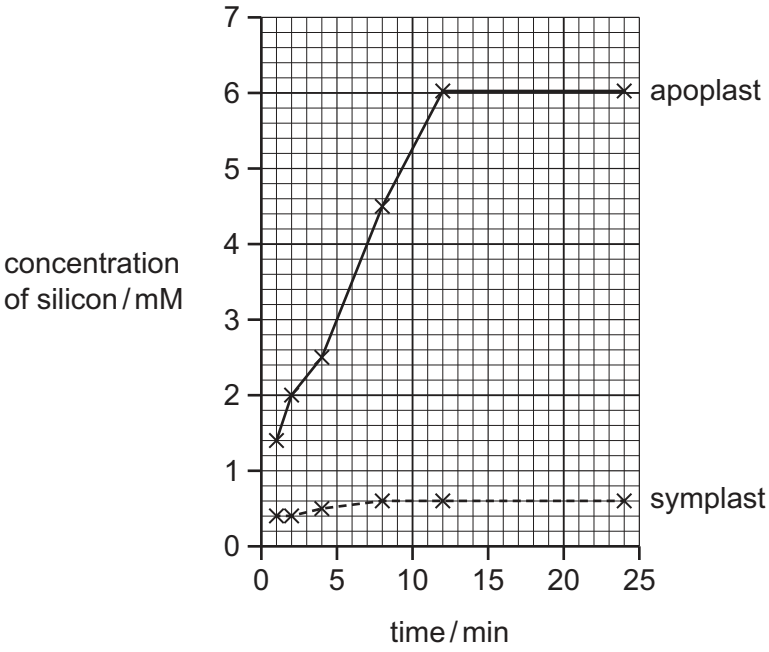
28 Which combination of features is characteristic of a phloem sieve tube element for it to be loaded from a source?

	water potential of the phloem sieve tube element	lignification of the cell wall
A	less negative than source	**not** present
B	less negative than source	present
C	more negative than source	**not** present
D	more negative than source	present

29 Scientists investigated the transport of silicon ions through the apoplast pathway and symplast pathway of rice plant roots.

Rice plant roots were placed into a solution of silicon ions. The concentration of silicon ions in the apoplast pathway and symplast pathway were measured six times.

The graph shows the results.



What can be concluded from this experiment?

1 Silicon ions can move through the root cell walls.

2 Silicon ions can pass across cell surface membranes.

3 At the endodermis, all the silicon ions move through the symplast pathway.

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

30 Companion cells are involved in the movement of carbohydrates into the sieve tube elements of phloem tubes.

Which row correctly identifies the carbohydrate and the processes?

	carbohydrate	**process of movement into companion cell**	**process of movement from companion cell to sieve tube element**
A	sucrose	cotransport	diffusion
B	sucrose	diffusion	active transport
C	glucose	cotransport	diffusion
D	glucose	diffusion	active transport

31 Carbonic anhydrase catalyses a reaction involved in the transport of carbon dioxide.

What happens immediately after this reaction?

A the formation of hydrogen ions and hydrogencarbonate ions

B the formation of carbaminohaemoglobin from carbon dioxide and haemoglobin

C the formation of carbon dioxide and water from hydrogencarbonate ions

D the formation of oxyhaemoglobin from haemoglobin and oxygen

32 Which pair of statements correctly describe processes that help to maintain a balance of positive and negative ions in red blood cells?

1 Chloride ions diffuse into red blood cells.

2 Chloride ions react with protons in red blood cells.

3 Hydrogencarbonate ions diffuse out of red blood cells.

4 Protons are released when carbonic acid breaks down in red blood cells.

5 Protons diffuse out of red blood cells.

A 1 and 3 **B** 1 and 5 **C** 2 and 5 **D** 3 and 4

33 The effects of some inherited heart defects are listed.

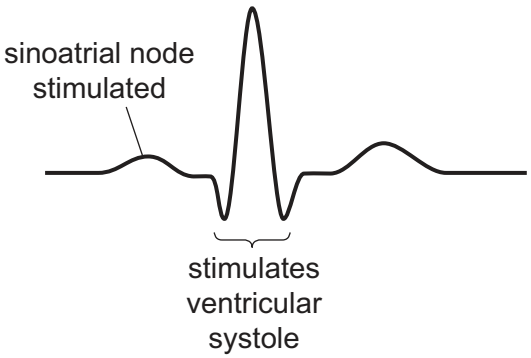
1 less blood travels to the lungs

2 oxygenated blood enters the wrong chamber

Which heart defects are most likely to cause the listed effects?

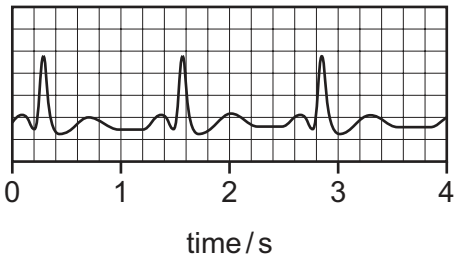
	1	2
A	narrowed semi-lunar valve in the pulmonary artery	pulmonary veins connected to the left atrium
B	narrowed semi-lunar valve in the aorta	pulmonary veins connected to the right atrium
C	narrowed semi-lunar valve in the pulmonary artery	pulmonary veins connected to the right atrium
D	narrowed semi-lunar valve in the aorta	pulmonary veins connected to the left atrium

34 The diagram shows the changes in electrical activity in the heart muscle during one cardiac cycle. This is called an electrocardiogram (ECG).

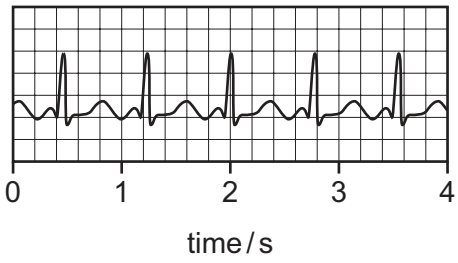


Which electrocardiogram shows a rate of 75 beats per minute?

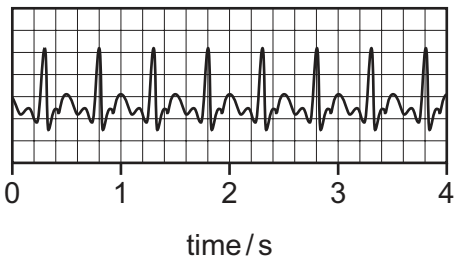
A



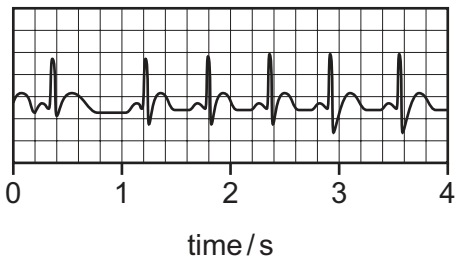
B



C



D



35 Premature babies are often born with a condition where the cartilage in the gas exchange system is weaker than normal.

The baby usually recovers from this condition after a few days.

Common symptoms of this condition are wheezing and a shortness of breath.

Which statement explains why these symptoms are associated with this condition?

A Bronchi are unable to resist external pressure on their walls, causing their cross-sectional area to reduce and limit air flow into the terminal bronchioles.

B Terminal bronchioles do **not** have sufficient strength within their walls to maintain a full opening, reducing the volume of air that can flow into the respiratory bronchioles.

C Alveoli are unable to recoil after breathing out, resulting in a reduced volume for the next breath, causing a lower capacity for gas exchange across the squamous epithelium.

D Respiratory bronchioles are more likely to collapse, causing the pathway into many individual alveoli to close, and preventing the removal of waste gases from the alveoli.

36 Which factors contribute to the spread of cholera?

1 poor control of flies

2 unclean drinking water

3 poor food hygiene

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

37 Scientists were tasked with finding alternative treatments to antibiotics for MRSA (Methicillin resistant *Staphylococcus aureus*) and *Escherichia coli* (*E. coli*).

MRSA and *E. coli* were grown on separate agar plates with four filter paper discs that had been soaked in one of the 200 $\mu g\,cm^{-3}$ solutions listed.

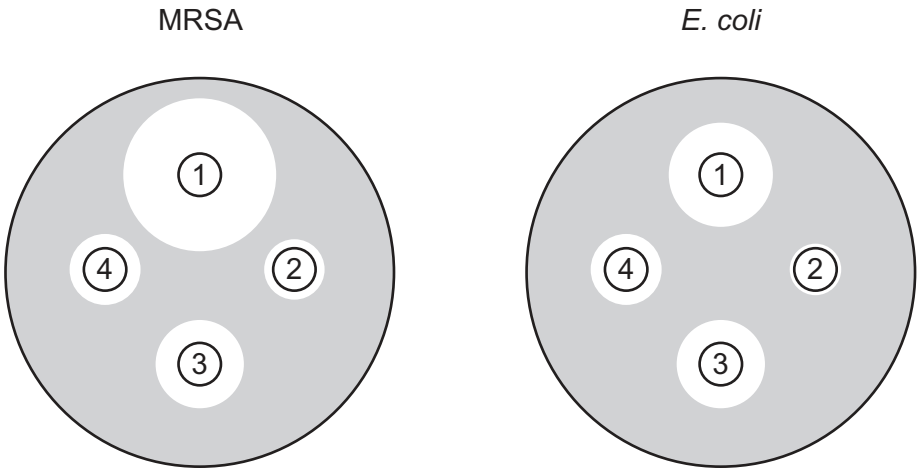
1 garlic extract

2 silver nanoparticles

3 gentamicin antibiotic

4 curcumin extract

Diagrams of the agar plates after a 48-hour incubation period are shown. The shaded areas on the agar plates show the location of living bacteria.



Which statement is a correct conclusion of the results?

A Gentamicin antibiotic can be used in combination with garlic extract to treat MRSA and *E. coli* infections.

B Garlic extract can be used to replace antibiotics in the treatment of MRSA and *E. coli* infections.

C MRSA and *E. coli* are affected more by garlic extract than treatments 2, 3 and 4.

D Treatments 2 and 4 have **no** effect on MRSA and *E. coli* infections.

38 Tissue-resident immune cells remain in tissues rather than circulating in the blood. They can remain in a tissue for hundreds of days.

When a pathogen is encountered for a second time, tissue-resident immune cells either coordinate the response to the pathogen or initiate an antibody response.

Which type of immune cell is described in the information about tissue-resident immune cells?

A macrophage

B memory cell

C neutrophil

D plasma cell

39 What is the first response by the immune system to a pathogen?

A ingestion of the pathogen by phagocytes

B production of antibodies

C production of antigens

D stimulation of lymphocytes

40 Which actions lead to a person developing passive immunity?

1 becoming infected by TB bacteria

2 drinking breast milk

3 receiving an injection of antigens

4 receiving an injection of antibodies

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

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