Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2021**

1 hour

You must answer on the multiple choice answer sheet.

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

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.
- 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 **16** pages.

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[Turn over

1 Which structures are present in plant cells but **not** in animal cells?

A cell membrane, cytoplasm, chloroplasts

B cell wall, chloroplasts, sap vacuole

C cell wall, cell membrane, cytoplasm

D cytoplasm, nucleus, chloroplasts

2 A piece of plant tissue is transferred from a beaker of water into a concentrated sugar solution.

Which row describes what happens?

	movement of water	volume of tissue cells
A	into the cells	decreases
B	into the cells	increases
C	out of the cells	decreases
D	out of the cells	increases

3 Which statements about active transport are correct?

1 Ions move from a region of high concentration to a region of low concentration.

2 Ions move across the cell membrane.

3 Energy released during respiration is used to move ions into or out of a cell.

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

4 What is a correct description of enzymes?

A biological catalysts made of lipids

B biological catalysts made of proteins

C catalysts that slow down chemical reactions and are changed by the reaction

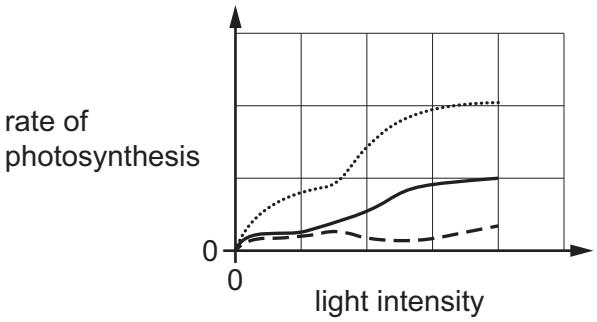
D catalysts that speed up chemical reactions and are changed by the reaction

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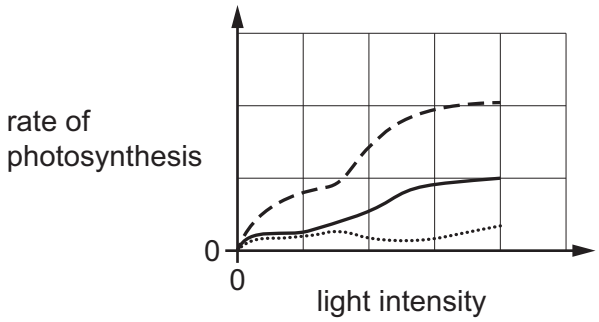
5 An investigation was carried out into the effects of light intensity and carbon dioxide concentration on the rate of photosynthesis.

Which graph shows the results of this investigation?

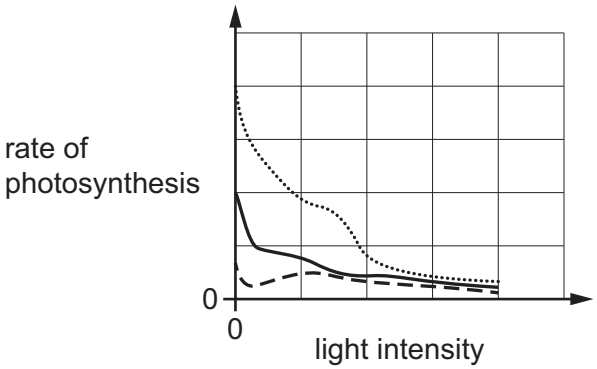
A



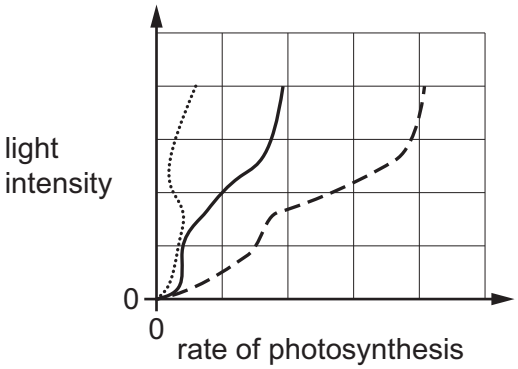
B



C



D



key

high carbon dioxide concentration

intermediate carbon dioxide concentration

low carbon dioxide concentration

6 What describes the upper cuticle of a leaf?

A a permeable layer allowing water to enter the leaf

B a single layer of cells containing many chloroplasts

C a single layer of transparent cells allowing light to enter the leaf

D a thin non-cellular layer preventing water loss from the leaf

7 Plants growing in soil lacking magnesium ions have poor growth.

What causes their poor growth?

A They cannot form cellulose for new cell walls.

B They cannot form chlorophyll for photosynthesis.

C They cannot produce amino acids to form proteins.

D They cannot take in mineral ions from the soil.

8 Which statement about diets is correct?

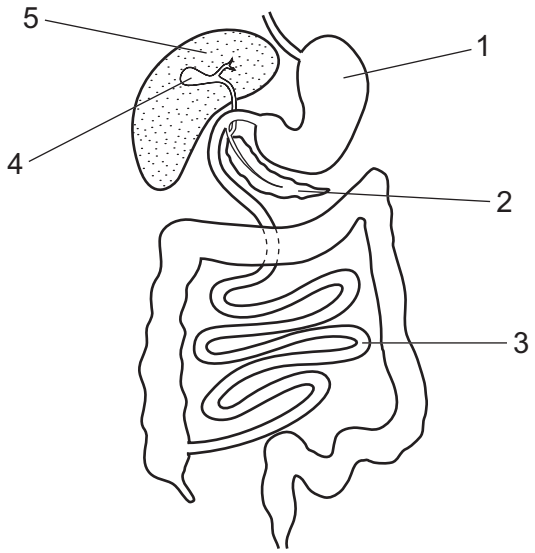
A A diet providing all the needs of an average man aged 70 can lead to malnutrition in an active boy aged 14.

B Malnutrition can only occur if the body receives less of a nutrient than it requires.

C Protein requirements in the diet increase throughout a person's life.

D Very young children require a greater total energy intake than active adults.

9 The diagram shows part of the human alimentary canal and associated organs.



Which row describes the functions of parts shown in the diagram?

	structure	function	structure	function
A	1	digestion of protein	3	absorption of the products of digestion
B	2	emulsifying fats	3	absorption of amino acids and glucose
C	4	production of bile	5	making digestive enzymes
D	4	storing digestive enzymes	2	making digestive enzymes

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10 What is **not** an example of assimilation?

A synthesis of glycogen from glucose

B synthesis of fats from fatty acids and glycerol

C synthesis of glucose from starch

D synthesis of proteins from amino acids

11 Which feature of a root hair cell helps it take up ions from water in the soil?

A The cell has a partially permeable cell wall.

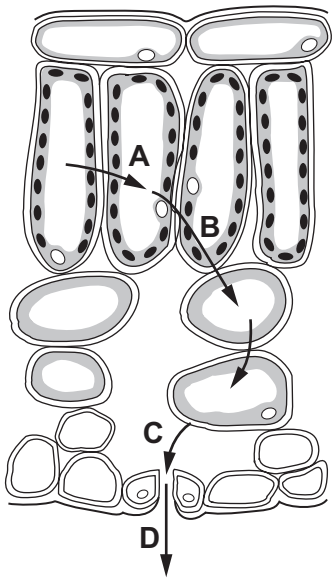
B The cell is able to provide a source of energy.

C The cell vacuole has a high ion concentration.

D The cell vacuole has a low water potential.

12 The diagram shows the pathway of water molecules through part of a leaf, seen under a microscope, in transverse section.

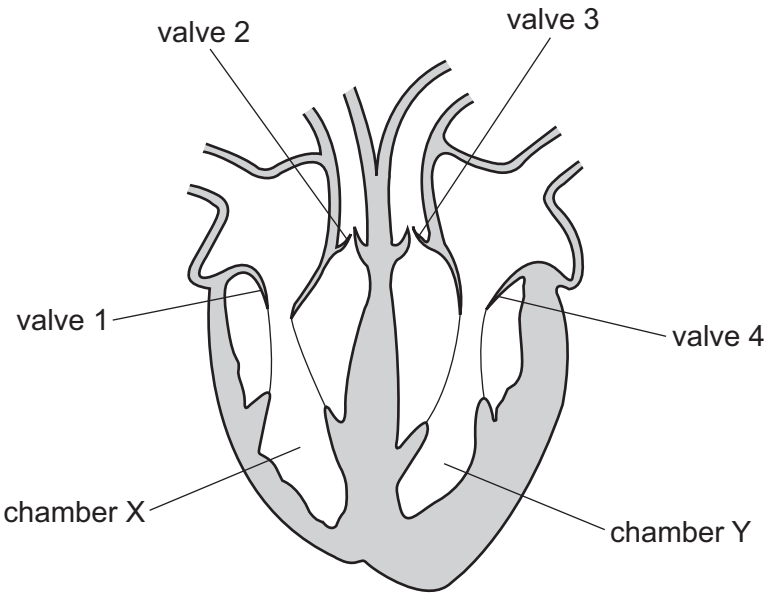
Where does water evaporate?



13 Which row describes the functions of the blood components?

	plasma	platelets	white blood cells
A	antibody formation	clotting	transport of nutrients
B	clotting	transport of nutrients	antibody formation
C	clotting	antibody formation	transport of nutrients
D	transport of nutrients	clotting	antibody formation

14 The diagram shows a section through the human heart.

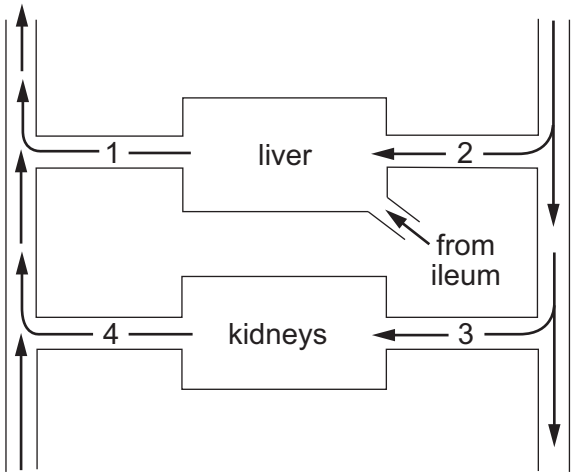


What will be the state of the valves when the walls of chambers X and Y are contracting?

	valves			
	1	2	3	4
A	closed	open	open	closed
B	closed	open	closed	open
C	open	closed	open	closed
D	open	closed	closed	open

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15 The diagram represents the blood supply to the liver and to the kidneys.



Which vessels contain blood with the highest and lowest concentrations of urea?

	highest	lowest
A	1	2
B	1	4
C	3	2
D	3	4

16 What is **not** a feature of aerobic respiration?

A It occurs in both plants and animals.

B It releases a smaller amount of energy than anaerobic respiration.

C It requires the presence of oxygen.

D The end products are carbon dioxide and water.

17 In an investigation, scientists treated plant roots with a chemical that stops aerobic respiration. They observed that after the treatment the plant roots absorbed nitrate ions more slowly.

Which statement explains this observation?

A Anaerobic respiration does not release energy.

B The plant cells cannot respire.

C There is less energy for active transport of nitrate ions.

D There is less energy for diffusion of nitrate ions.

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18 Why does oxygen enter the blood in the lungs?

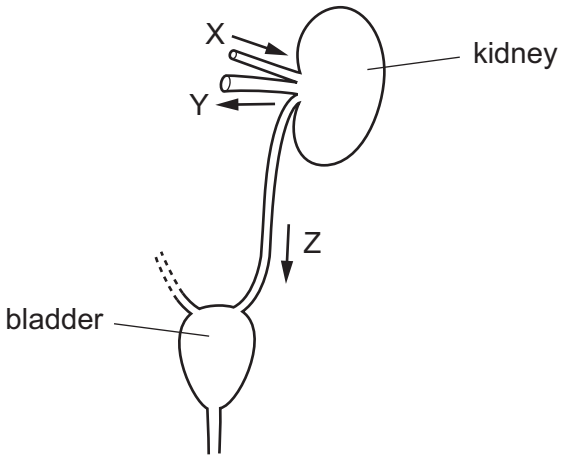
A Aerobic respiration takes place in the lungs.

B Carbon dioxide diffuses out of the blood into the alveoli.

C The air in alveoli contains a higher concentration of oxygen than the blood in the lung capillaries.

D The air in alveoli contains a lower concentration of oxygen than the blood in the lung capillaries.

19 The diagram shows structures in a human which form and store urine. Liquids pass through tubes X, Y and Z in the directions shown by the arrows.



Which statement about the volume of liquid passing through Y in one day is correct?

A It is greater than that passing through X.

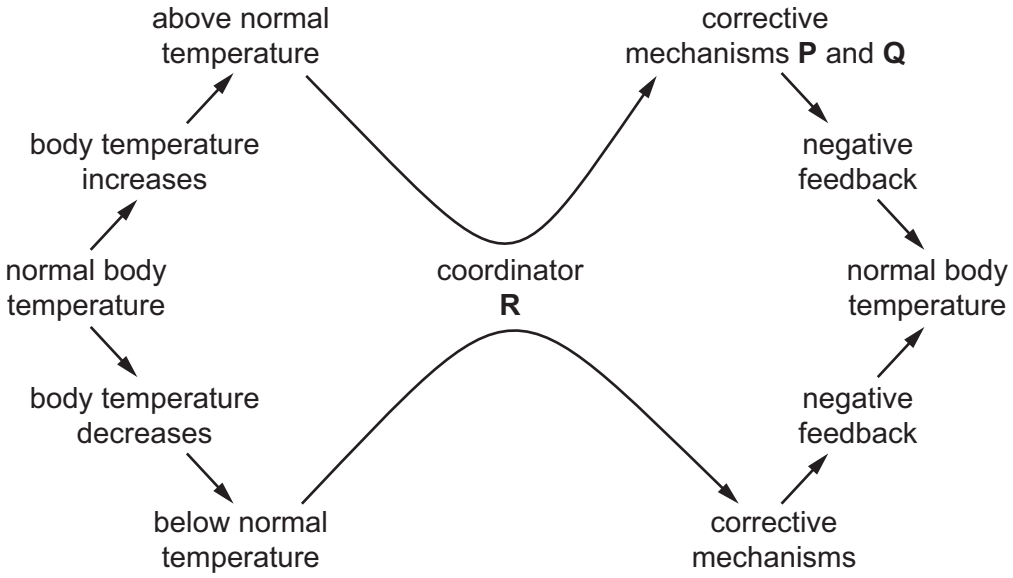
B It is less than that passing through Z.

C It is much less than that passing through X but slightly greater than that passing through Z.

D It is slightly less than that passing through X but much greater than that passing through Z.

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20 The diagram shows the homeostatic control of body temperature.

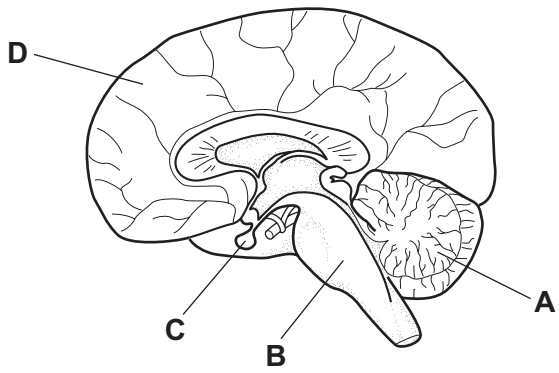


What are corrective mechanisms **P** and **Q** and coordinator **R**?

	corrective mechanisms		coordinator **R**
	P	**Q**	
A	sweating	more blood flows close to the skin surface	brain
B	sweating	more blood flows close to the skin surface	skin
C	shivering	less blood flows close to the skin surface	brain
D	shivering	less blood flows close to the skin surface	skin

21 The diagram shows a section through the brain.

Which part of the brain secretes hormones?



22 Which changes occur in the eye when viewing a distant object?

1 The ciliary muscles contract.

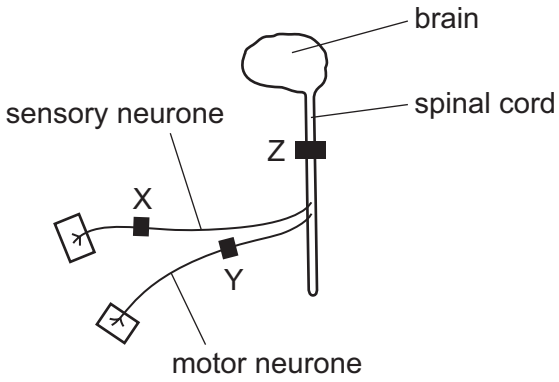
2 The ciliary muscles relax.

3 The suspensory ligaments are pulled tight.

4 The suspensory ligaments are slackened.

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

23 The diagram shows three positions, X, Y and Z, where nerve impulses are blocked by a drug.



Which person listed below moves their leg in response to a pinprick, but does **not** feel it?

A a person with a block at X

B a person with a block at Y

C a person with a block at Z

D a person with no block

24 Which pair of bones form a hinge joint in the forelimb?

A humerus and scapula

B radius and ulna

C scapula and radius

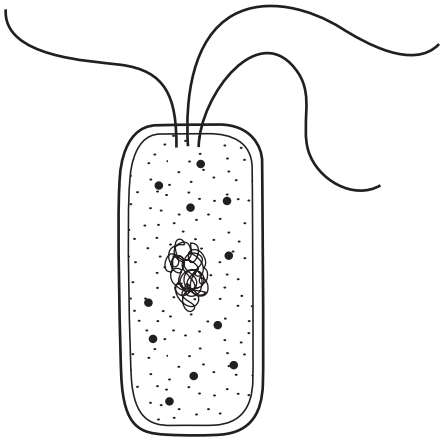
D ulna and humerus

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25 What are the effects of drinking a large quantity of alcohol on the human body?

	effects on the body		
	acts as a	reaction time	damages the
A	depressant	decreases	kidney
B	depressant	increases	liver
C	stimulant	increases	kidney
D	stimulant	decreases	liver

26 The diagram shows the structure of a bacterium.



In what way does this differ from a cell of a fungus?

A The bacterium has a cell membrane.

B The bacterium has a cell wall.

C The bacterium has cytoplasm.

D The bacterium has no true nucleus.

27 Bacteria are involved in the manufacture of which product?

A alcohol

B bread

C yoghurt

D penicillin

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[Turn over

28 These processes occur in living organisms in a food chain.

1 excretion

2 photosynthesis

3 respiration

Which processes would result in a loss of energy from a food chain?

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

29 Which statements are correct?

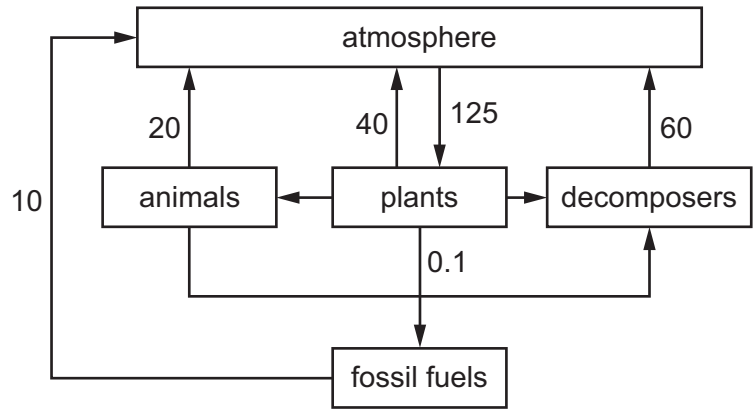
1 Energy cannot be recycled in food webs.

2 Producers make their own organic nutrients.

3 The Sun is the principal source of energy input to biological systems.

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

30 The diagram shows the movement of carbon in the carbon cycle, in gigatonnes per year.



How many gigatonnes of carbon are moved by respiration each year?

A 120 **B** 125 **C** 130 **D** 255

31 What are the roles of the female mosquito and the malarial pathogen in the spread of malaria?

	female mosquito	malarial pathogen
A	parasite	vector
B	parasite	parasite
C	vector	parasite
D	vector	vector

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32 Which human activity will make the greatest contribution to global warming?

A cutting down established trees and replanting with young trees

B cutting down established trees and using the cleared land to raise cattle

C reducing the use of diesel fuel in public transport vehicles

D using fewer insecticides and herbicides on farms

33 The diagram shows two onion plants.



Using the information in the diagram, which statement about these onion plants is correct?

A Daughter plants are produced from the small bulb by meiosis.

B Daughter plants produced from the flower are genetically identical to the parent plant.

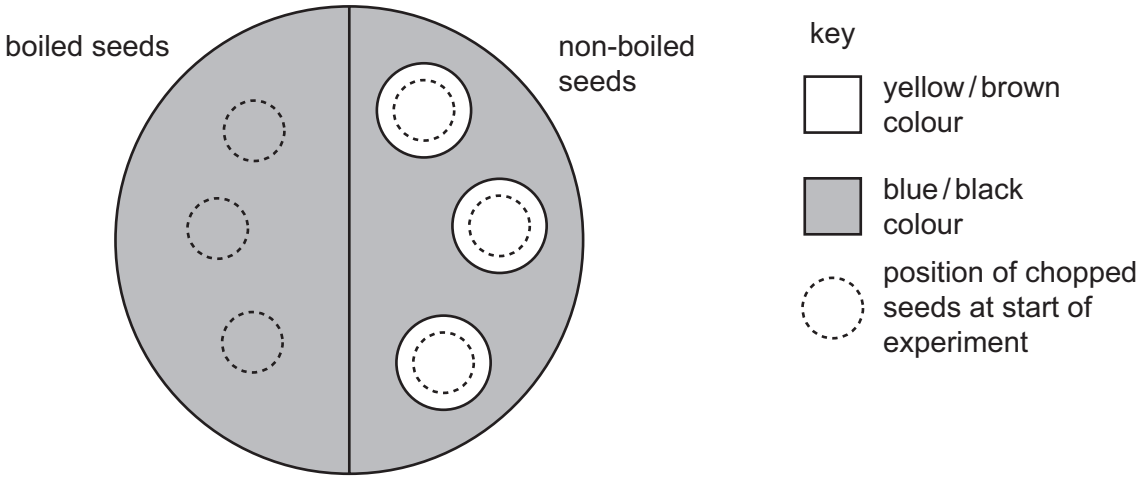
C The plants can reproduce sexually and asexually.

D Two parent plants are required for reproduction.

34 Six bean seeds were soaked in cold water. Three of them were boiled and cooled. The boiled and the non-boiled seeds were chopped up and then placed on the surface of agar jelly containing starch.

After two days, all the seeds were removed and the jelly was tested with iodine solution.

The diagram shows the result of the experiment.



What is the explanation for the results with the non-boiled bean seeds?

A They absorb iodine.

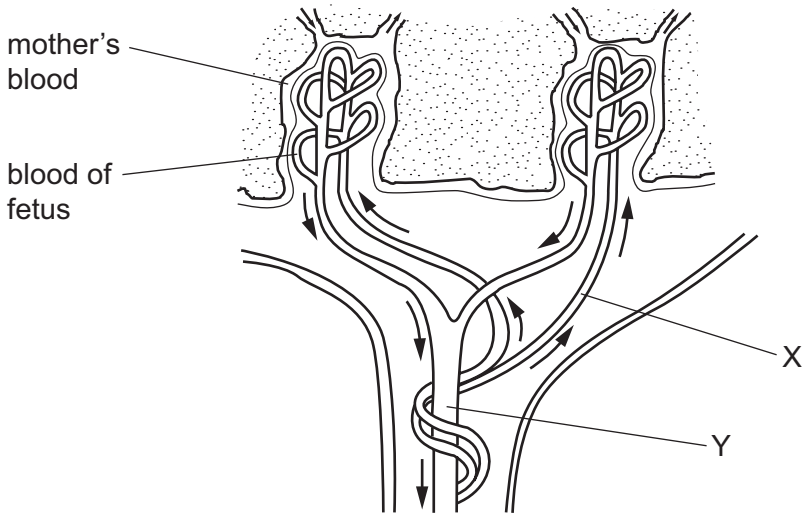
B They absorb starch.

C They contain acid.

D They contain amylase.

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35 The diagram shows how the blood of a human fetus flows close to the mother's blood in the placenta.



Which substances are present at X in higher concentrations than at Y?

A carbon dioxide and glucose

B carbon dioxide and urea

C glucose and oxygen

D glucose and urea

36 Why will antibiotics **not** cure a person with HIV infection?

A Viruses are much smaller than bacteria.

B Viruses are not affected by antibiotics.

C Viruses are made from protein and DNA.

D Viruses are not pathogens.

37 Chromosomes, DNA molecules and genes are pieces of inherited material with different sizes.

Which statement describes the relationship between these pieces of inherited material?

A A chromosome is larger than a gene.

B A gene is larger than a chromosome.

C Multiple chromosomes make up a DNA molecule.

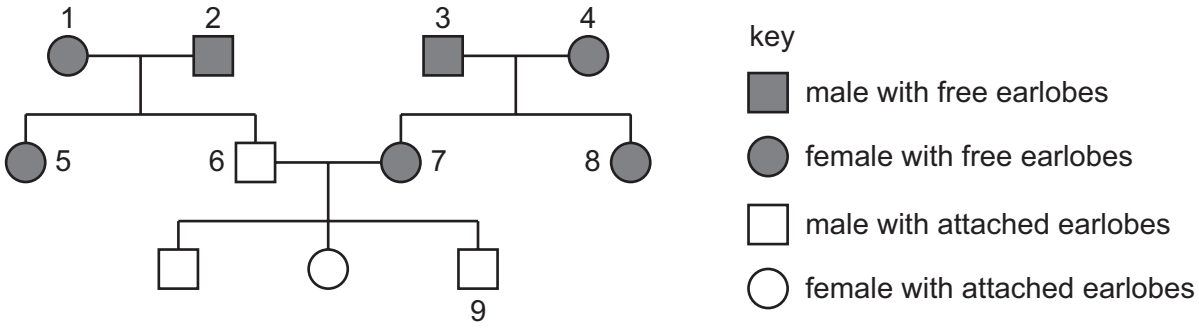
D Multiple DNA molecules make up a gene.

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38 Earlobes can either be attached to the cheek or be 'free' (unattached). This characteristic is controlled by a single gene.

The allele for attached earlobes is recessive.

The diagram shows the inheritance of attached earlobes in one family.



Which two individuals **must** be heterozygous for earlobe attachment?

A 1 and 7 **B** 3 and 4 **C** 5 and 8 **D** 6 and 9

39 Which statements about natural selection are correct?

	natural selection can lead to better adapted species surviving	natural selection can lead to extinction of a species	natural selection can lead to gene mutations occurring
A	true	true	true
B	true	true	false
C	true	false	true
D	false	true	true

40 Which feature of a cereal crop **cannot** be improved by selective breeding alone?

A ability to fix nitrogen

B resistance to drought

C tolerance to low temperatures

D number of seeds produced

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