Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2020**

1 hour

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)

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

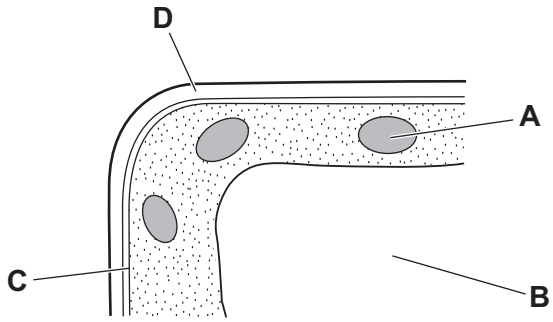
- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

This document has **16** pages. Blank pages are indicated.

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1 The diagram shows part of a plant cell.

Which part controls the entry of substances into the cell?



2 Which statements about diffusion are correct?

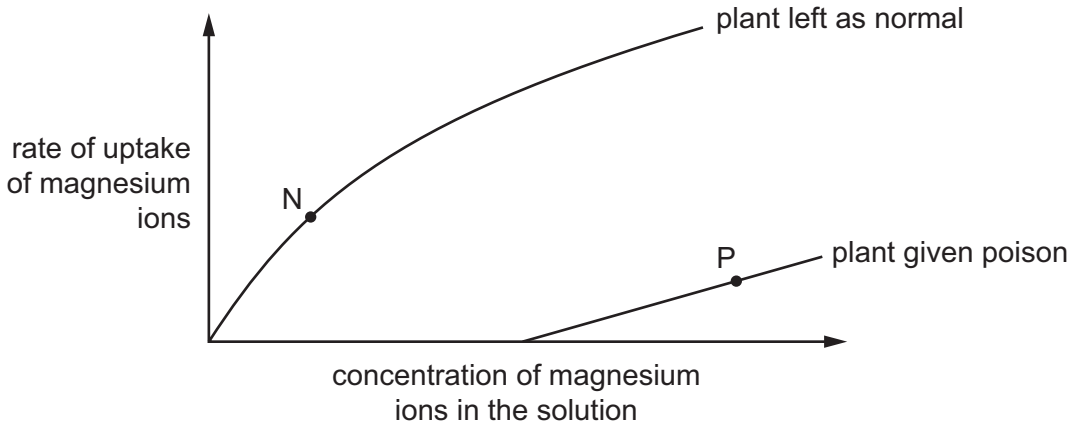
1 Molecules move at random.

2 Molecules move down a concentration gradient.

3 Molecules may move through a partially permeable membrane.

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

3 An experiment measured the rate at which plants take up magnesium ions from solution. One plant was given a poison that stops respiration. Another plant was left as normal. The graph shows the results.



How are the magnesium ions being absorbed by the plants at points N and P?

	point N	point P
A	active transport	active transport
B	active transport	diffusion
C	diffusion	active transport
D	diffusion	diffusion

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4 Starch digestion occurs in the mouth cavity and in the duodenum but it stops in the stomach.

Why is this?

A All the starch has been digested before it reaches the stomach.

B Cells in the stomach do not produce amylase.

C The pH in the stomach changes the shape of the amylase.

D The temperature in the stomach is too high for amylase to work.

5 Which part of a leaf absorbs and uses carbon dioxide from the air?

A cuticle

B mesophyll

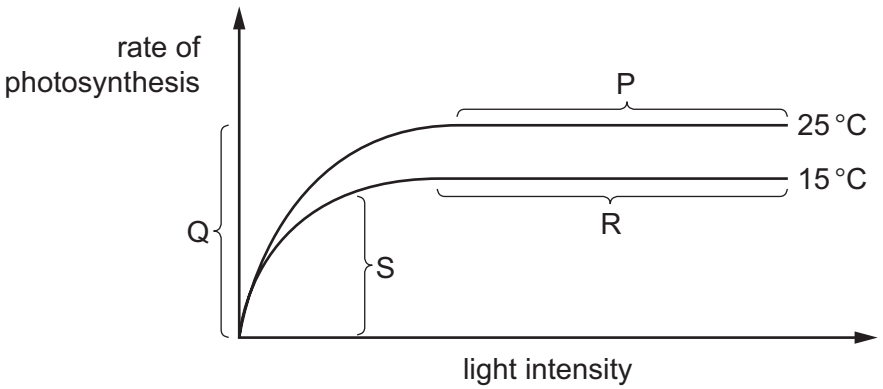
C phloem

D xylem

6 How do carbon dioxide and water enter a leaf?

	carbon dioxide	water
A	diffusion	active transport
B	diffusion	transpiration pull
C	osmosis	active transport
D	osmosis	transpiration pull

7 The graph shows how the rate of photosynthesis varies with light intensity at two different temperatures. Other variables are kept the same.



In which sections of the graph is light intensity limiting the rate of photosynthesis?

A P and R **B** Q and S **C** R and Q **D** S and P

8 What are the substrates and end products for amylase and lipase?

	amylase		lipase	
	substrate	end product	substrate	end product
A	protein	amino acids	fat	fatty acids and glycerol
B	protein	amino acids	glycogen	glucose
C	starch	maltose	fat	fatty acids and glycerol
D	starch	maltose	protein	amino acids

9 What is the main function of the villi in the ileum?

A to increase the surface area for absorption

B to move digested food along the intestine by peristalsis

C to produce mucus so that materials can move smoothly

D to secrete amylase to digest starch in the food

10 The symptoms of a disease include weakness, fatigue, aching and swollen joints, and swollen and soft gums.

Which food is used to treat this disease?

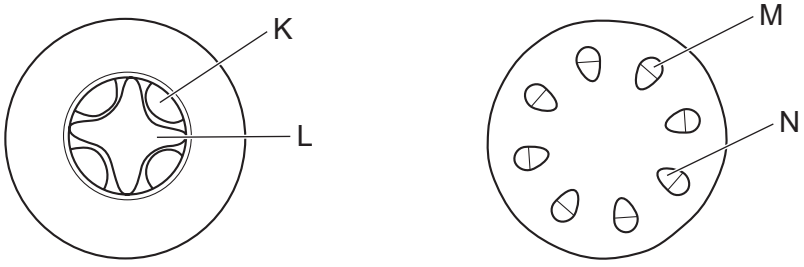
A liver as a source of iron

B milk as a source of calcium

C oily fish as a source of vitamin D

D oranges as a source of vitamin C

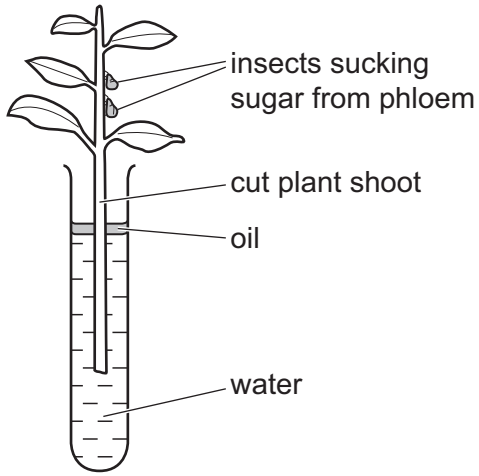
11 The diagrams show transverse sections of a dicotyledonous root and stem.



Which tissues transport sugar?

A K and M **B** K and L **C** L and M **D** L and N

12 The diagram shows a cut plant shoot in a container of water.



What will stop the movement of water up this stem?

A a fall in the humidity of the air

B a rise in the air temperature

C a blockage in the xylem

D an insect sucking sugar from the phloem

13 Which pathway does oxygenated blood follow in the human body?

A pulmonary artery → left and right atria → left and right ventricles

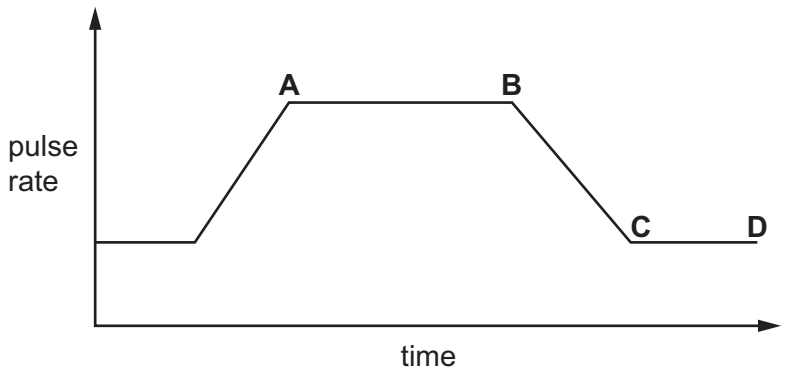
B pulmonary artery → left atrium → left ventricle → aorta

C pulmonary vein → left and right atria → left and right ventricles

D pulmonary vein → left atrium → left ventricle → aorta

14 The graph shows a person's pulse rate over a period of time during which they rest, pedal an exercise bike and then rest again.

At which point did the person stop pedalling?



15 Which row shows the blood pressures in an artery, a capillary and a vein?

	pressure / kPa		
	artery	capillary	vein
A	0.6	4.0	13.0
B	4.0	0.6	13.0
C	13.0	0.6	4.0
D	13.0	4.0	0.6

16 Anaerobic respiration takes place when there is a lack of which substance?

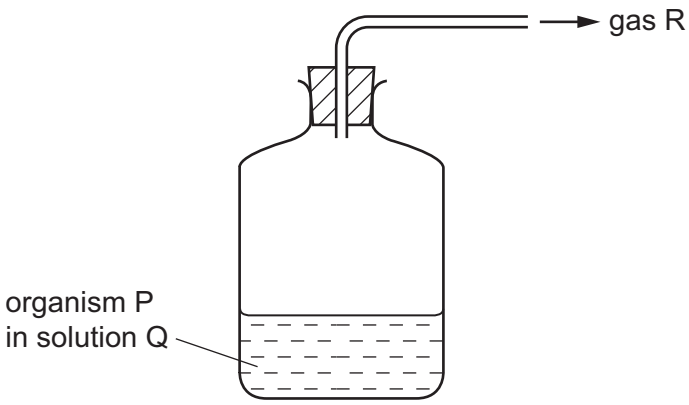
A carbon dioxide

B glucose

C lactic acid

D oxygen

17 The apparatus shown is used to make alcohol by anaerobic respiration.

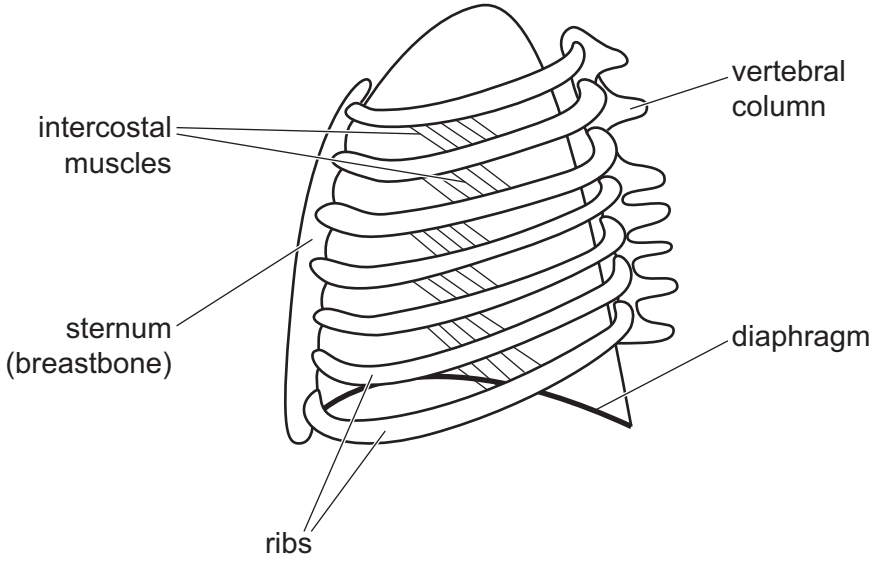


What are P, Q and R?

	P	Q	R
A	amylase	starch	oxygen
B	bacterium	amino acids	nitrogen
C	fungus	glucose	carbon dioxide
D	virus	sucrose	water vapour

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18 The diagram shows the rib cage and some of the muscles involved in breathing as seen from the side.



What happens when the intercostal muscles shown in the diagram contract?

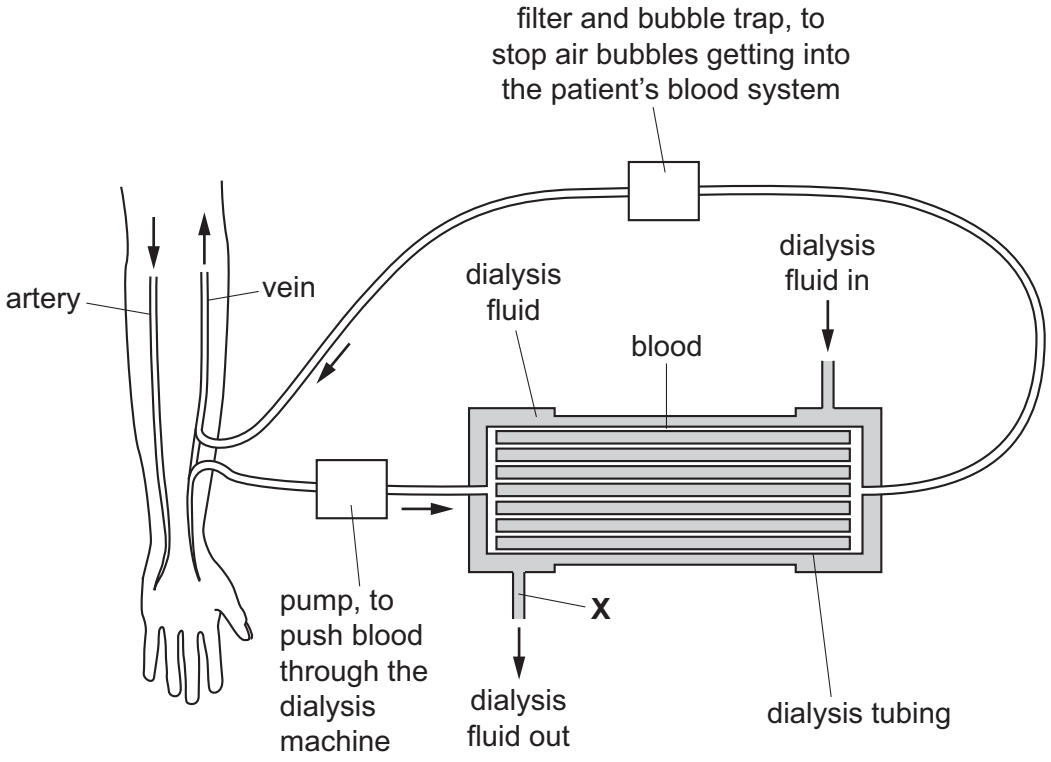
A The diaphragm moves down.

B The lungs inflate.

C The pressure inside the lungs decreases.

D The ribs move down.

19 The diagram shows a dialysis machine.



Which substance would **not** be present in a sample of the dialysis fluid taken from point **X**?

A glucose molecules

B salt ions

C plasma proteins

D urea molecules

20 Which part of the skin has a major role in insulating the human body?

A blood vessels

B fatty tissue

C hair follicles

D sweat glands

21 What describes a reflex action?

A It is a rapid response to a stimulus, involving the spinal cord.

B It is a rapid response detected by motor neurones.

C It is a slow response to a stimulus, involving the spinal cord.

D It is a slow response detected by motor neurones.

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22 A person looks at some hills far away.

Which row shows the state of the lenses, ciliary muscles and suspensory ligaments in her eyes?

	thick lenses	contracted ciliary muscles	suspensory ligaments under tension
A	✓	✓	✓
B	✓	✗	✗
C	✗	✓	✗
D	✗	✗	✓

key

✓ = yes

✗ = no

23 What is a sign of diabetes mellitus?

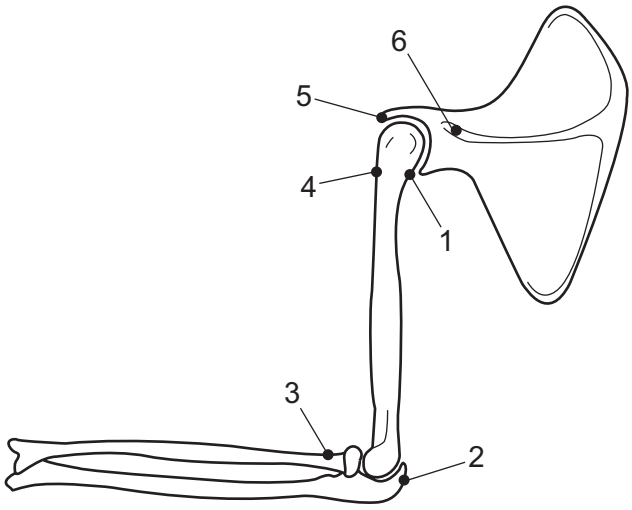
A glucose in the blood

B glucose in the urine

C insulin in the blood

D insulin in the urine

24 The diagram shows the bones of the forelimb.



Which labels show where the muscle that straightens the hinge joint is attached?

A 1 and 2 **B** 3 and 4 **C** 4 and 5 **D** 4 and 6

25 Which of these diseases can be treated effectively with antibiotics?

1 HIV

2 malaria

3 syphilis

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

26 The table shows the characteristics of four microorganisms.

Which one could be a virus?

	contains one or more cells	contains one or more cell nuclei	produces spores
A	✗	✗	✗
B	✓	✗	✗
C	✓	✓	✗
D	✓	✓	✓

key

✓ = true

✗ = false

27 A fermenter is used to produce penicillin.

Why is continuous stirring necessary during the process of fermentation?

A to keep the *Penicillium* in contact with fresh oxygen and nutrients

B to move the *Penicillium* to the bottom of the fermenter

C to move the *Penicillium* to the top of the fermenter

D to stop the *Penicillium* reacting with the wall of the fermenter

28 Which statement describes relationships in ecosystems?

A Carbohydrates are passed from decomposers to producers.

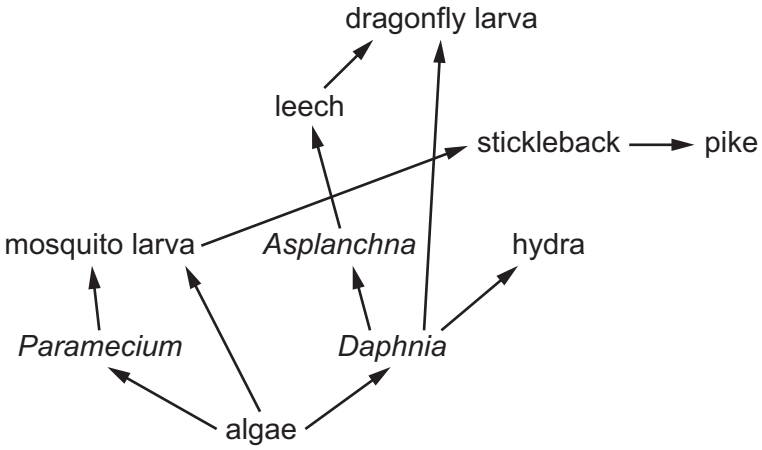
B Energy is passed from carnivores to herbivores.

C Proteins are passed from primary consumers to producers.

D Carbohydrates are passed from producers to herbivores.

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29 The diagram shows a food web of organisms found in a pond.



Which organism is both a herbivore and a carnivore?

A algae

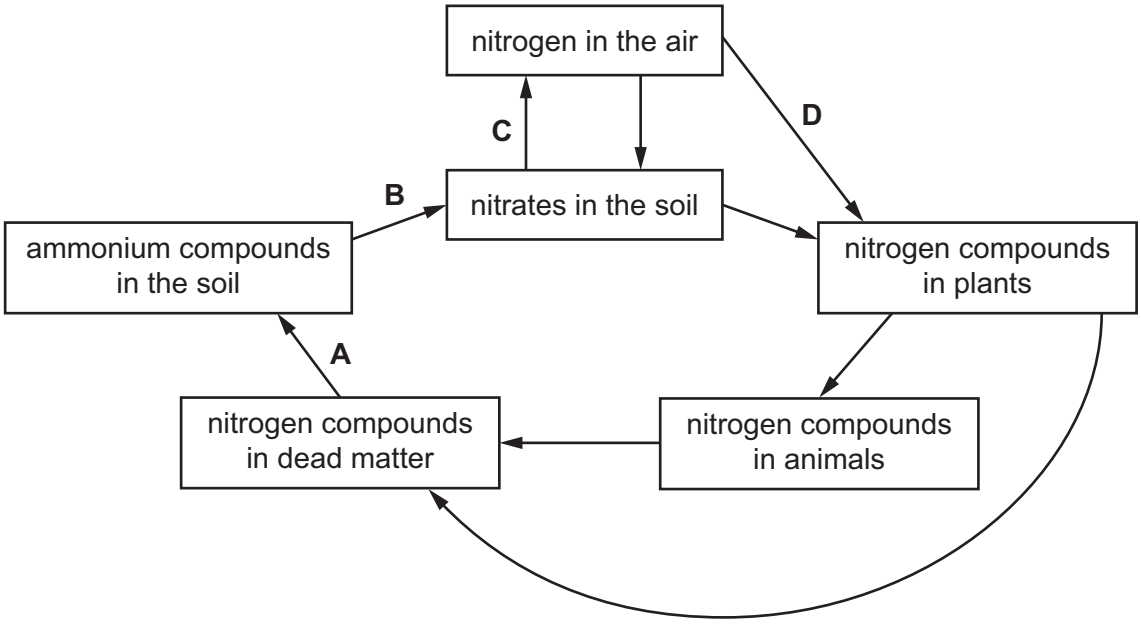
B dragonfly larva

C mosquito larva

D *Paramecium*

30 The diagram shows the nitrogen cycle.

Which stage is carried out by nitrifying bacteria?



31 Three statements about malarial parasites are listed.

1 Insecticides are used to kill the vectors.

2 Netting is used to keep the vectors away from people.

3 People take drugs that stop the malarial pathogen developing.

Which methods can be used to control malaria?

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

32 What would be an **undesirable** feature in an insecticide?

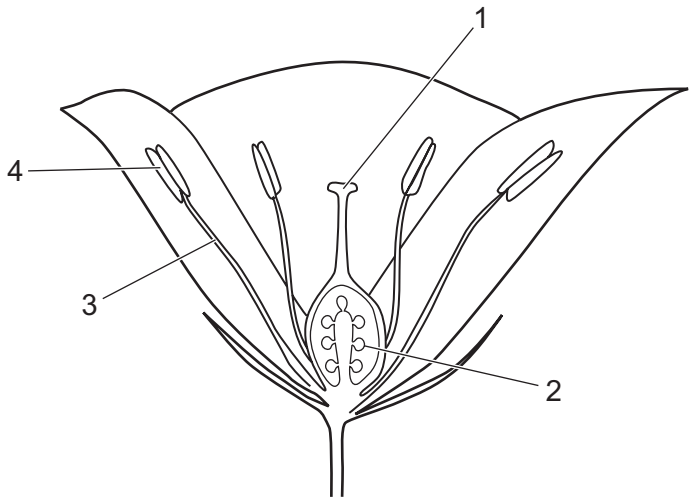
A It becomes more concentrated at each stage in the food web.

B It breaks down within a few months.

C It destroys one particular insect only.

D It destroys the immature forms of an insect.

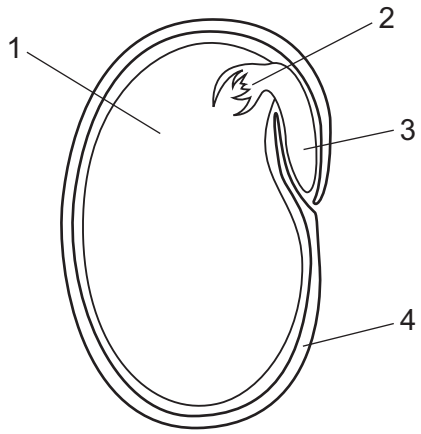
33 The diagram shows a flower cut in half.



Which **two** parts of the flower produce haploid gametes?

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

34 The diagram shows a section through a non-endospermic seed.



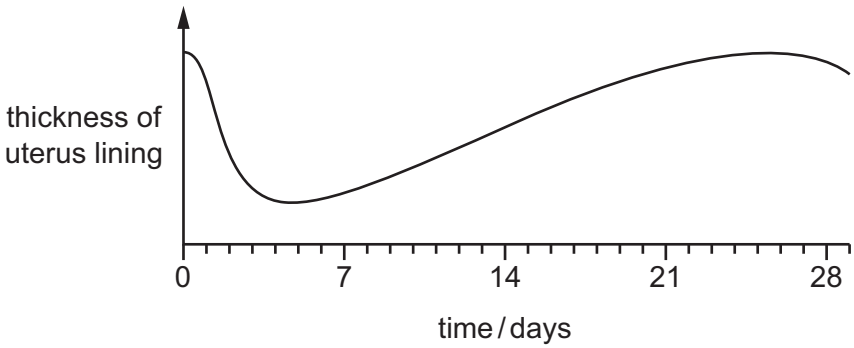
Which structures develop into the adult plant?

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

35 Which row describes a cause, a symptom and a treatment for syphilis in males?

	cause	symptom	treatment
A	bacterium	development of painful joints	antibiotics
B	bacterium	severe headaches	antibodies
C	virus	burning sensation during urination	antibiotics
D	virus	infertility	antibodies

36 The diagram shows the changes in thickness of the uterus lining during one menstrual cycle.



When would the levels of progesterone and LH be highest?

	progesterone	LH
A	between day 12 and 16	between day 25 and 28
B	between day 19 and 23	on day 14
C	on day 5	between day 1 and 5
D	on day 13	on day 10

37 In a species of mouse, fur colour can be black or white. Two black female mice were allowed to mate with the same black male. One female had nine young, all of which were black. The other female had seven young, five black and two white.

One of these white mice was male, and is allowed to mate with a heterozygous female.

What is the expected ratio of phenotypes of their offspring?

A 1 black : 1 white

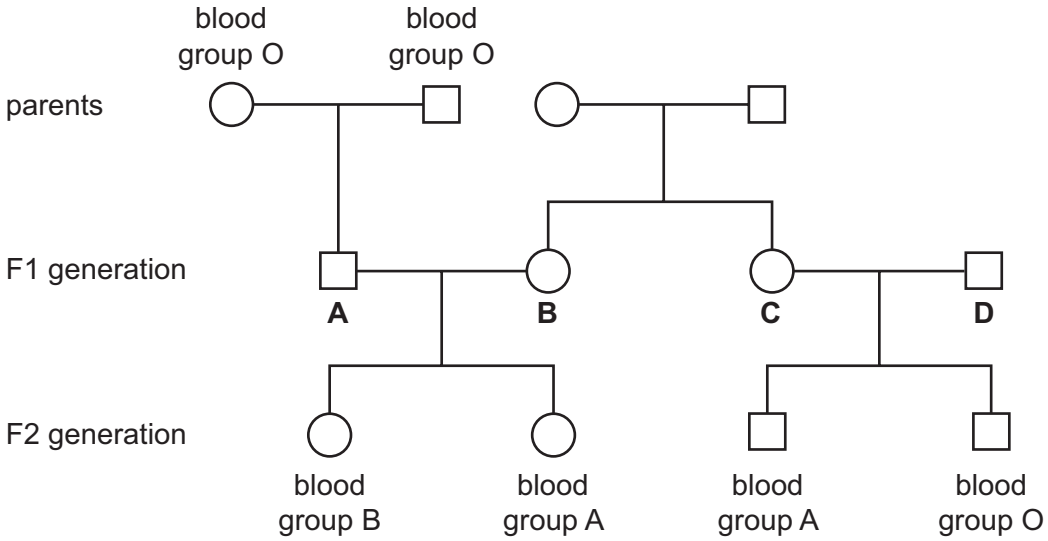
B 1 black : 3 white

C 1 black : 2 grey : 1 white

D 3 black : 1 white

38 The diagram shows the blood group phenotypes of some members of a family.

Which member of the F1 generation must be heterozygous with the codominant alleles?



39 Which human characteristic shows discontinuous variation?

A body mass

B heart rate

C height

D sickle cell anaemia

40 A farmer wants to produce extra-large, sweet oranges, by selective breeding.

Using information from the table, which plant types should the farmer select for breeding?

plant type	size of orange / cm			percentage sugar content	
	6–9	9–12	12–15	10	20
1		✗		✗	
2			✗	✗	
3	✗				✗
4		✗			✗
5	✗			✗	

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

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