Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

Paper 1 Multiple Choice **October/November 2017**

1 hour

Additional Materials: Multiple Choice Answer Sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

1349503121

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.
Do not use staples, paper clips, glue or correction fluid.
Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.
DO **NOT** WRITE IN ANY BARCODES.

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 separate Answer Sheet.

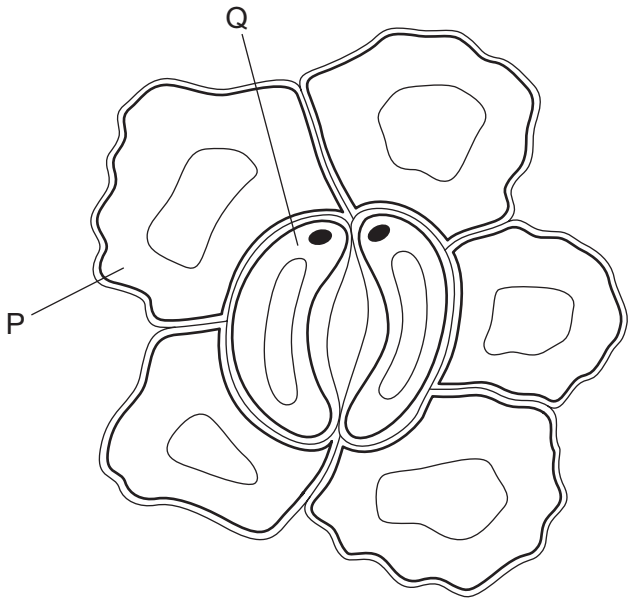
Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

This document consists of **17** printed pages and **3** blank pages.

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1 The diagram shows cells in the epidermis of a leaf.



To complete the diagram, which structural features should be added to the cells P and Q?

	P		Q	
	chloroplasts	nucleus	chloroplasts	nucleus
A	✓	✓	✗	✗
B	✓	✗	✓	✓
C	✗	✓	✓	✗
D	✗	✗	✗	✓

key
✓ = yes
✗ = no

2 By which process does water vapour pass out of a leaf?

A active transport

B diffusion

C osmosis

D translocation

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3 A student takes a potato and cuts three pieces from it. Each piece is 5 cm × 0.5 cm × 0.5 cm. He places the three potato pieces into three different sugar solutions.

After two hours, he removes the potato pieces from the sugar solutions and measures their lengths.

The results are shown in the table.

solution	length of potato piece after two hours / cm
X	5.2
Y	4.7
Z	5.3

What can be concluded from these results?

A Solution Y has a lower water potential than the potato.

B Solution Z has the lowest water potential.

C The potato piece in solution X increases in length because it takes up sugar.

D The potato piece in solution Y decreases in length because it loses sugar.

4 According to the lock and key hypothesis, what is the lock and what is the key for the enzyme lipase?

	lock	key
A	lipids	fatty acids
B	fatty acids	lipase
C	lipids	lipase
D	lipase	lipids

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[Turn over

5 A student investigates the effect of different colours of light on the rate of photosynthesis.

In three separate experiments, he shines red, blue, or green light onto an aquatic plant. The number of oxygen bubbles produced by the plant is counted.

Each experiment is carried out three times and the average number of bubbles calculated.

colour of light	average number of bubbles produced / minute
red	48
blue	37
green	12

What explains the results?

A Chlorophyll absorbs red and blue light more than green light.

B Green light is absorbed by the water.

C Most of the green light is absorbed by the chlorophyll.

D Red light is used least in photosynthesis.

6 When is carbon dioxide absorbed, and when is it released, by an ecosystem such as a tropical rainforest?

	absorbed	released
A	darkness	darkness
B	darkness	daylight
C	daylight	darkness
D	daylight	daylight

7 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

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8 Blood from the ileum is carried in the hepatic portal vein to the liver.

Why is this an advantage to the body?

A Amino acids can be converted to urea before they enter the general circulation.

B Excess glucose can be converted to glycogen for storage and not excreted.

C It ensures that fat products pass through the liver before they reach the heart.

D Toxic materials can be destroyed before they reach any body cells.

9 The table shows the compositions of four foods.

Which food provides the most energy per gram?

	carbohydrate %	fat %	protein %	water %
A	1	16	28	55
B	2	83	2	13
C	5	4	3	88
D	12	20	23	45

10 After eating, the pH in the mouth decreases.

Which statement explains this decrease?

A Bacteria release acids.

B Enzymes in saliva release acids.

C Salivary glands release acids.

D Sensory neurones in the tongue release acids.

11 Which statements about root hairs are correct?

1 They increase the surface area for the plant to take up water.

2 They increase the surface area for the plant to take up minerals.

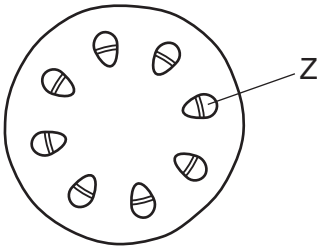
3 They increase the surface area for the plant to photosynthesise.

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

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[Turn over

12 The diagram shows a section through a plant stem.



Which process is responsible for moving substances in region Z?

A diffusion

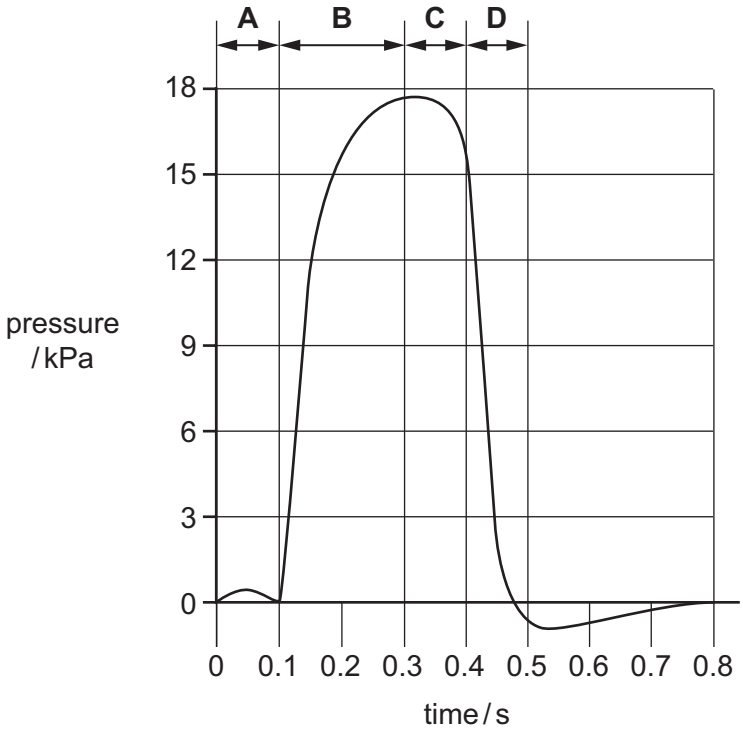
B osmosis

C translocation

D transpiration

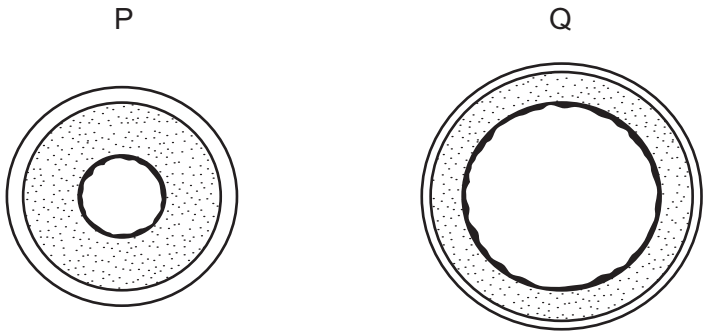
13 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left **atrium** contracting?



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14 The diagram shows cross-sections of two blood vessels, P and Q.

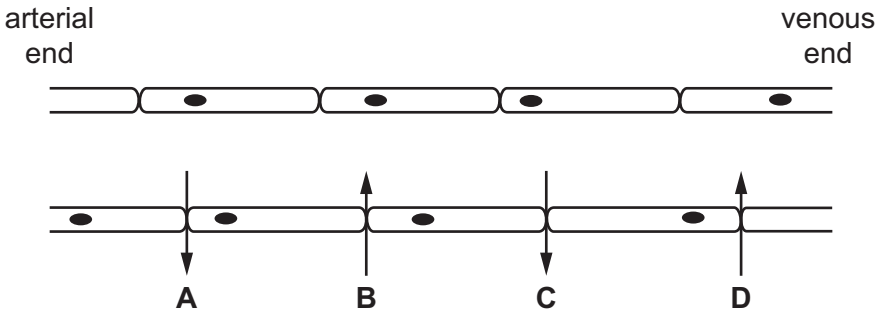


What types of blood vessel are they?

	P	Q
A	artery	capillary
B	artery	vein
C	vein	artery
D	vein	capillary

15 The diagram shows a section of capillary.

Which arrow represents tissue fluid formation?



16 What is **not** a feature of alveoli?

A a large surface area

B a moist surface

C cilia

D walls one cell thick

17 Which structures contract to cause us to breathe out with force when sneezing?

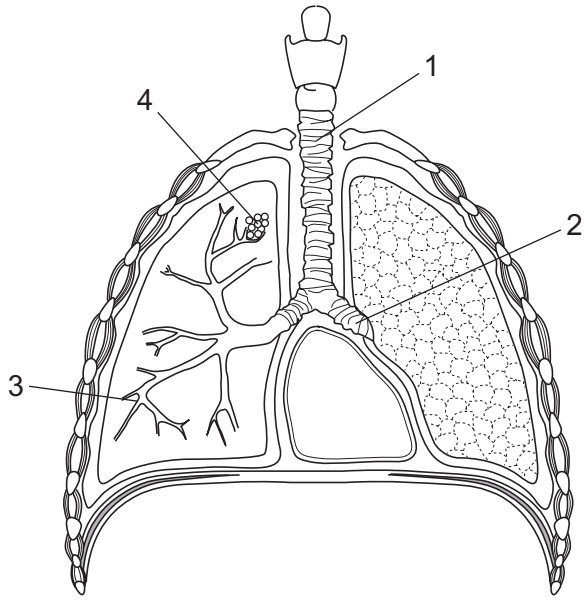
A bronchioles

B diaphragm muscles

C external intercostal muscles

D internal intercostal muscles

18 The diagram shows the human gas exchange system.

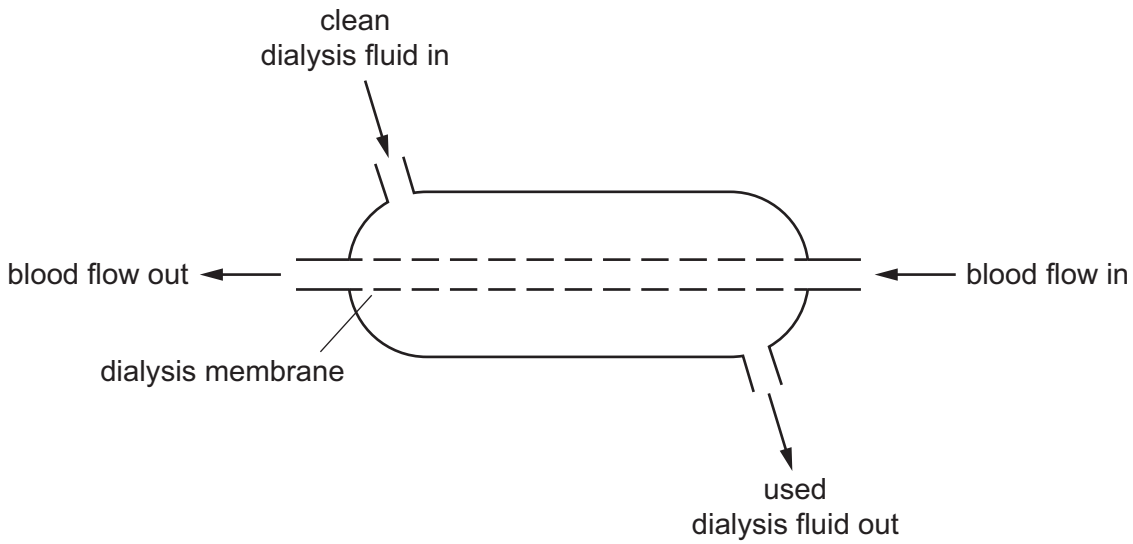


What are the labelled parts?

	1	2	3	4
A	alveolus	trachea	bronchus	bronchiole
B	bronchiole	alveolus	trachea	bronchus
C	bronchus	bronchiole	alveolus	trachea
D	trachea	bronchus	bronchiole	alveolus

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19 The diagram shows a simplified dialysis machine.



How do the urea concentrations in the blood and dialysis fluid change as they pass through the apparatus?

	urea concentration in blood	urea concentration in dialysis fluid
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

20 What helps heat retention in the human body?

A actively secreting sweat glands

B dilated blood vessels near skin surface

C fat in and under the skin

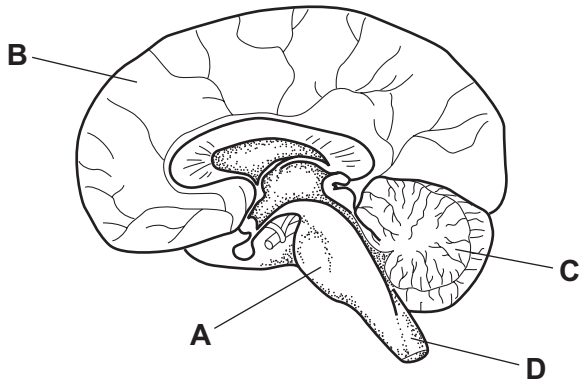
D relaxed hair erector muscles

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21 The diagram shows a section through the human brain.

Which part is the cerebellum?



22 A person is reading a book in dim light.

Which row shows the state of the eye muscles?

	ciliary muscles	iris circular muscles	iris radial muscles
A	contracted	contracted	relaxed
B	contracted	relaxed	contracted
C	relaxed	contracted	relaxed
D	relaxed	relaxed	contracted

23 Which chemical produced by the body alters the activity of a target organ and is destroyed by the liver?

A bile

B enzyme

C hormone

D saliva

24 Which statement about the ulna is correct?

A It fits into a notch on the radius to form the elbow joint.

B It forms a hinge joint with the humerus at the shoulder.

C It has a projection to which an extensor muscle is attached.

D It links the radius to the scapula.

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25 Which of these structures would be the first to receive nicotine absorbed into the blood from tobacco smoke?

A brain

B left atrium

C liver

D right atrium

26 Some characteristics of microorganisms are listed.

1 can be killed by antibiotics

2 cell wall made of chitin

3 genetic material is DNA or RNA

4 have hyphae

5 make spores

6 may have flagella

7 have a protein coat

8 release enzymes to digest food

9 reproduce inside a host cell

Which row matches the features of bacteria, fungi and viruses?

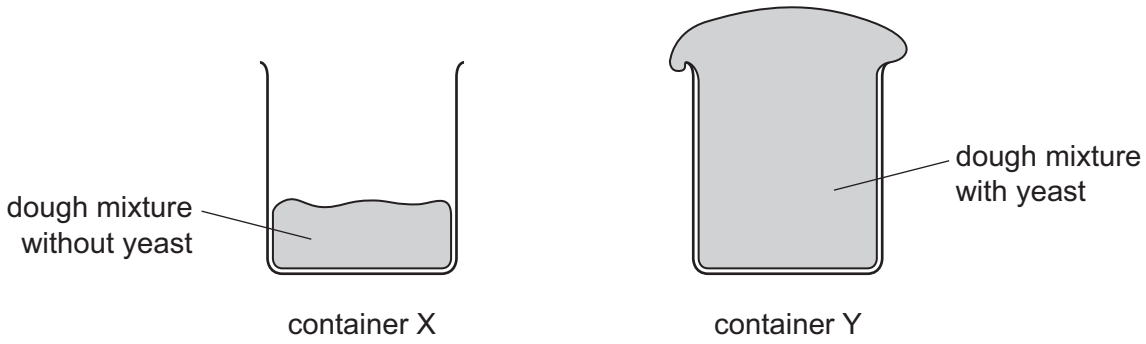
	bacteria	fungi	viruses
A	1 and 6	4 and 5	7 and 9
B	2 and 4	3 and 8	1 and 5
C	6 and 9	1 and 7	2 and 3
D	7 and 8	2 and 3	6 and 9

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[Turn over

27 Two containers, X and Y, were filled with equal amounts of dough mixture for making bread. The mixture in Y had yeast in it.

The containers were then left in a warm place for two hours. The diagram shows their appearance after this time.



Which substance produced by the yeast causes the difference between containers X and Y?

A alcohol

B carbon dioxide

C lactic acid

D oxygen

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.

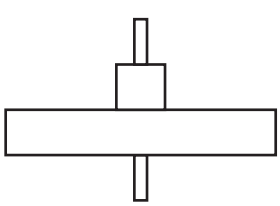
D Water is passed from respiring decomposers to producers.

29 The diagram shows a food chain.

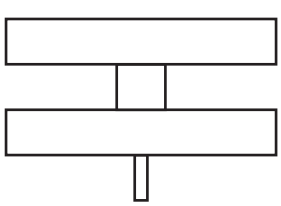
grass → rabbit → fox → flea

Which pyramid of numbers matches this food chain?

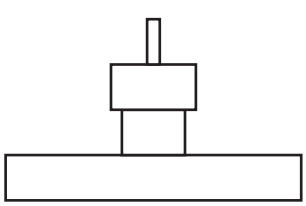
A



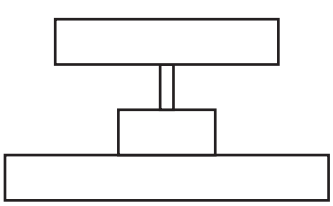
B



C

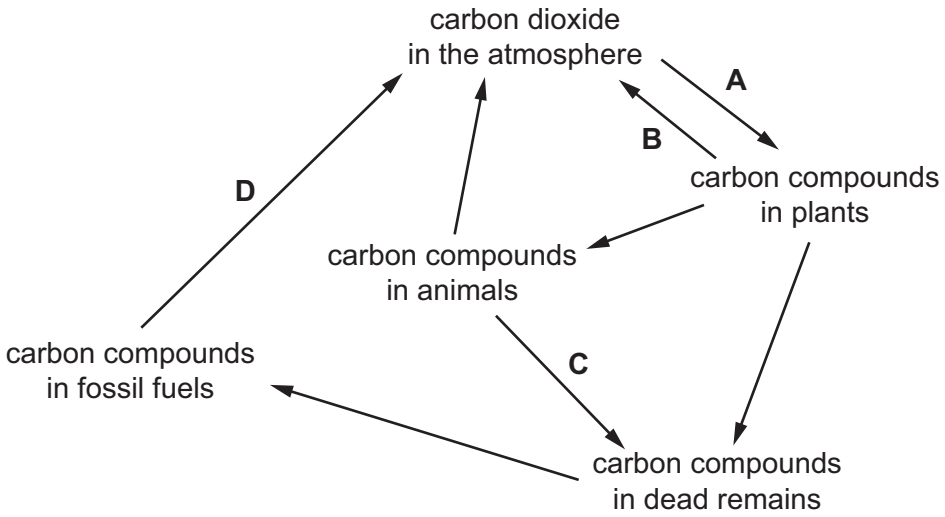


D



30 The diagram shows the carbon cycle.

During which stage in the cycle is **oxygen** excreted by living organisms?



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.

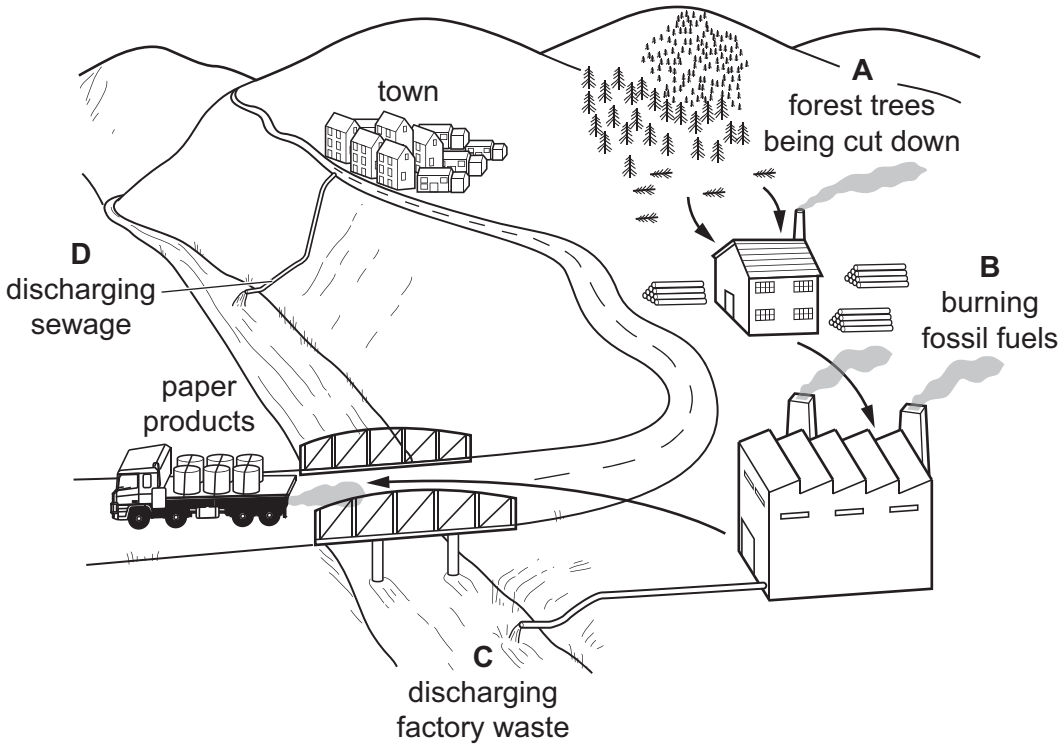
3 People take drugs that stop the malarial pathogen developing.

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 The diagram shows some ways in which human activities affect the environment.

Which activity is most likely to lead to acid rain?



33 Which statements about meiosis are correct?

	meiosis produces genetically identical nuclei	meiosis produces haploid nuclei
A	false	false
B	false	true
C	true	false
D	true	true

34 Which conditions are needed for the germination of most seeds?

	light	oxygen	water
A	✓	✓	✗
B	✗	✓	✗
C	✓	✗	✓
D	✗	✓	✓

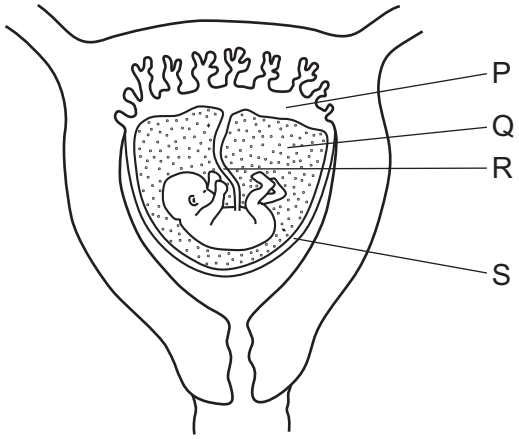
key

✓ = yes

✗ = no

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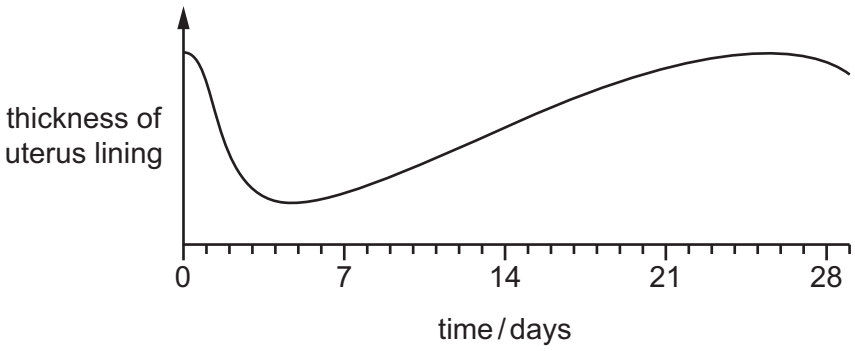
35 The diagram shows a fetus in the uterus.



Which of the labelled structures are essential for feeding the fetus, and which for supporting it and protecting it from mechanical shocks?

	feeding	supporting and protecting
A	P and Q	R and S
B	P and R	Q and S
C	Q and S	P and R
D	R and S	P and Q

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

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[Turn over

37 A gene is a unit of inheritance that controls the production of

A a chromosome.

B an allele.

C a protein.

D DNA.

38 Two brothers had different blood groups. One was blood group A and the other was group B.

What can be concluded about their parents' blood group genotypes?

A Both of the parents must be heterozygous.

B Both of the parents must be homozygous.

C One parent (at least) must be heterozygous.

D One parent (at least) must be homozygous.

39 What is a potential danger of growing genetically engineered crops?

A changing the genotypes of plants in nearby ecosystems

B producing cereals with different nutrient content

C producing greater yields within a shorter time

D reducing the amount of pesticides on crops

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40 The table shows the genotypes and phenotypes for hair colour for the members of a family, but **one** phenotype is shown incorrectly.

	genotype		phenotype
family member	allele 1	allele 2	hair colour
mother	a	A	brown
father	A	A	brown
son 1	a	A	blonde
daughter 1	a	a	blonde
son 2	A	A	brown
daughter 2	A	a	brown

Which family member has the **incorrect** phenotype?

A daughter 1

B daughter 2

C son 1

D son 2

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