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Cambridge O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2015**

1 hour

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

* 8 6 4 9 2 9 1 4 2 1 *

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.

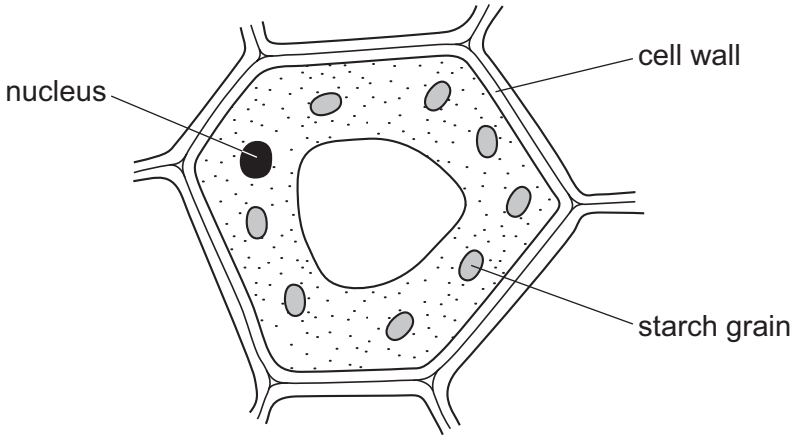
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
Electronic calculators may be used.

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

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1 The diagram shows a plant cell. The cell is stained with iodine solution.



After staining with iodine solution, what are the colours of the cell wall and the starch grain?

	cell wall	starch grain
A	blue-black	blue-black
B	blue-black	orange-brown
C	orange-brown	blue-black
D	orange-brown	orange-brown

2 What describes the diffusion of molecules?

A movement from a region of their higher concentration to a region of their lower concentration down a concentration gradient

B movement from a region of their higher concentration to a region of their lower concentration up a concentration gradient

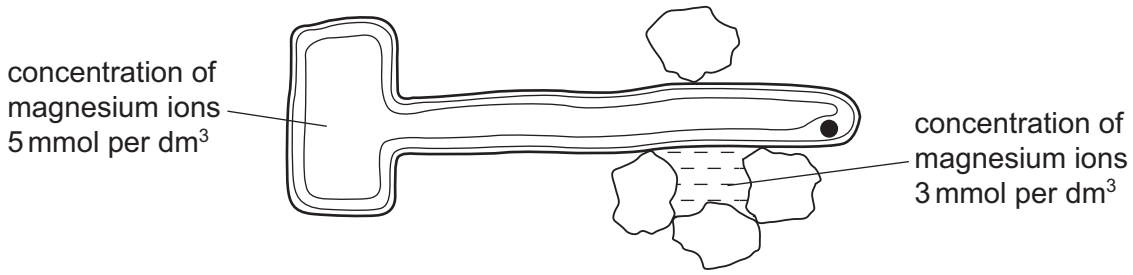
C movement from a region of their lower concentration to a region of their higher concentration down a concentration gradient

D movement from a region of their lower concentration to a region of their higher concentration up a concentration gradient

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3 The diagram shows the concentration of magnesium ions in a healthy root hair cell of a plant and in the soil water surrounding it.



For the plant to remain healthy, how will the magnesium ions move?

A into the cell by active transport

B into the cell by diffusion

C out of the cell by active transport

D out of the cell by diffusion

4 What is the enzyme that controls a reaction in which both the enzyme and the substrate can denature at high temperatures?

A amylase

B insulin

C lipase

D protease

5 Which part of a leaf contains cells, but with the fewest chloroplasts?

A cuticle

B epidermis

C spongy mesophyll

D stomata

6 Which features of the mesophyll layer in a leaf aid rapid diffusion of carbon dioxide into the cells?

	air spaces	layer of moisture on the outside of the cell walls
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = aids diffusion

✗ = does not aid diffusion

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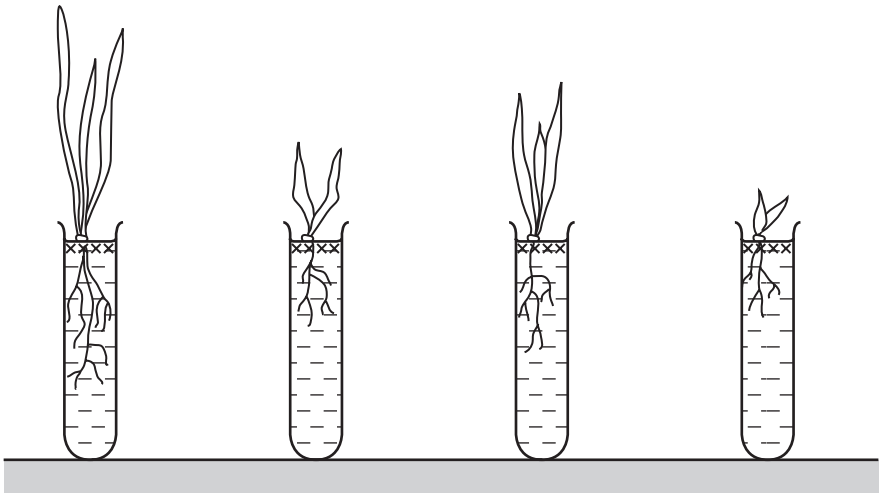
7 A student grows seedlings in four different test-tubes.

Tube W contains all the mineral ions needed for healthy plant growth.

The other three tubes contain

- water
- all minerals except magnesium ions
- all minerals except nitrates.

The diagram shows the appearance of these seedlings after two weeks.



W	X	Y	Z
healthy growth	little growth	poor growth and yellow leaves	hardly any growth

What do tubes X, Y and Z contain?

	X	Y	Z
A	all minerals except magnesium ions	all minerals except nitrates	water
B	all minerals except magnesium ions	water	all minerals except nitrates
C	all minerals except nitrates	all minerals except magnesium ions	water
D	water	all minerals except magnesium ions	all minerals except nitrates

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8 Which digestive processes take place in the mouth (buccal) cavity?

	chemical digestion	mechanical digestion	dissolving of nutrients
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

9 What would be **least likely** to cause famine?

A decrease in human population

B decrease in rainfall

C increase in human population

D increase in rainfall

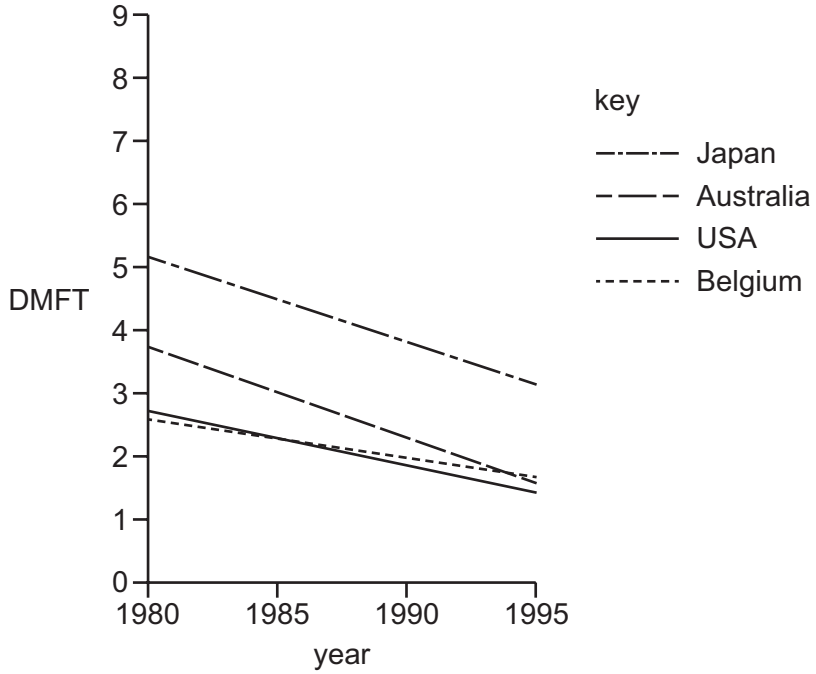
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10 The health of a population's teeth can be measured by finding the average number of decayed, missing or filled teeth per person. This is called the DMFT.

The graph shows the DMFT for four countries in the years between 1980 and 1995. Australia and the USA have fluoride added to their water but Japan and Belgium do not.



The following statements were made.

1 The health of teeth has improved in all four countries.

2 Japan showed the greatest improvement.

3 Adding fluoride to the water causes the health of teeth to improve.

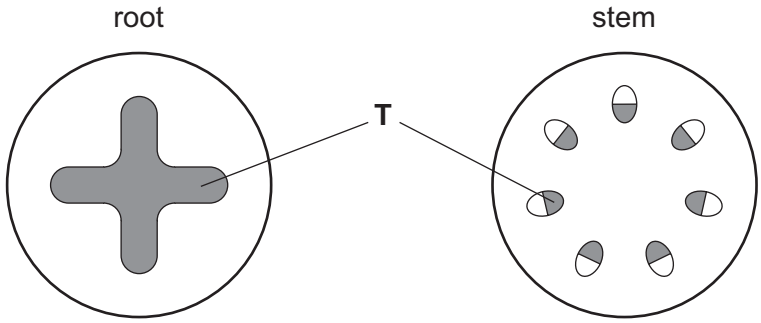
Which statements are supported by the graph?

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

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11 The diagram shows cross-sections through the root and stem of the same plant.



What is tissue **T**?

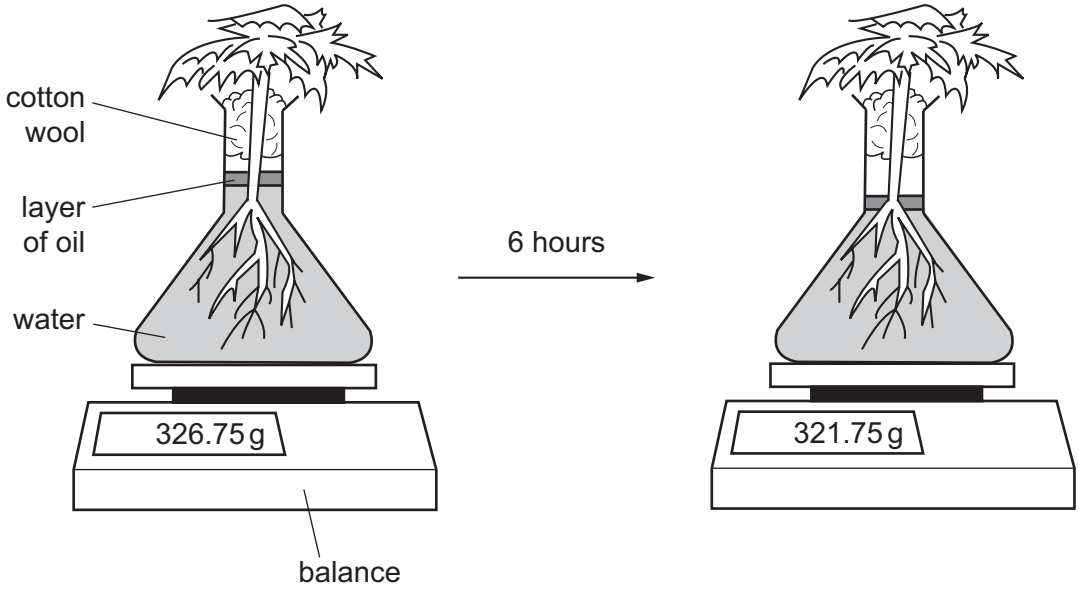
A epidermis

B mesophyll

C phloem

D xylem

12 The diagrams show a plant in a flask of water. It is left in the light at 16 °C for six hours.



What explains the change in mass after six hours?

A absorption of water into the root hairs

B evaporation of water from the flask

C photosynthesis in the leaves of the plant

D transpiration from the leaves of the plant

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13 Which organ receives blood from two major vessels and all of this blood leaves it in a single major vessel?

A heart

B kidney

C liver

D lung

14 In the human circulatory system, what causes the transfer of materials from the capillaries to the tissue fluid?

A active transport

B blood pressure

C capillarity

D osmosis

15 Which chamber of the heart would be the first to receive nicotine absorbed into the blood in the lungs of a cigarette smoker?

A left atrium

B left ventricle

C right atrium

D right ventricle

16 What is the composition of expired air?

gas	composition (%)			
	A	**B**	**C**	**D**
oxygen	4	16	16	21
carbon dioxide	21	4	0.04	0.04
nitrogen	74	78	78	78
water vapour	variable	saturated	saturated	variable

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17 What happens when we breathe out with force?

	diaphragm	external intercostal muscles	internal intercostal muscles
A	contracts	contract	relax
B	contracts	relax	relax
C	relaxes	contract	contract
D	relaxes	relax	contract

18 Which changes occur as a person exercises?

	depth of breathing	breathing rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

19 A person drinks a large amount of water.

How does this affect the water potentials of the liquids in the renal arteries, the renal veins and the ureters?

	water potential in renal arteries	water potential in renal veins	water potential in ureters
A	higher	higher	higher
B	higher	little change	higher
C	lower	lower	little change
D	lower	lower	lower

20 What are the responses to decreased body temperature?

A shivering and vasoconstriction in blood vessels near the skin surface

B shivering and vasodilation in blood vessels near the skin surface

C sweating and vasoconstriction in blood vessels near the skin surface

D sweating and vasodilation in blood vessels near the skin surface

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21 What are the symptoms of diabetes?

	concentration of glucose	
	in blood	in urine
A	+	+
B	+	–
C	–	+
D	–	–

key

+ = increased

– = decreased

22 Which row correctly describes the connections of the neurones in a reflex action?

	receptor to central nervous system	between neurones	central nervous system to effector
A	motor neurone	relay neurone	sensory neurone
B	motor neurone	sensory neurone	relay neurone
C	sensory neurone	motor neurone	relay neurone
D	sensory neurone	relay neurone	motor neurone

23 What does the hypothalamus control?

A body temperature

B heart rate

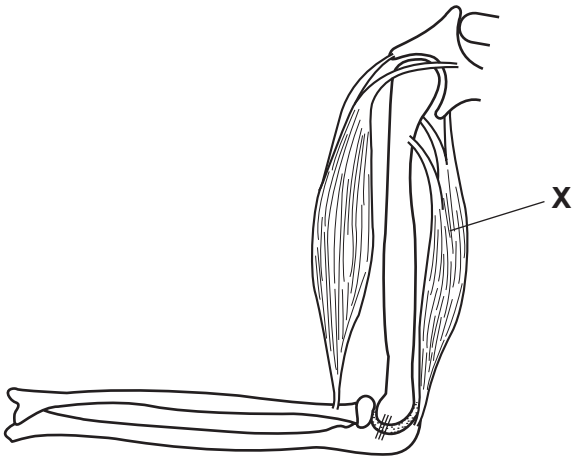
C insulin secretion

D rate of breathing

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24 The diagram shows the main muscles and bones of the arm.



What happens when muscle **X** contracts?

A The lower arm is extended.

B The lower arm is raised.

C The upper arm is lowered.

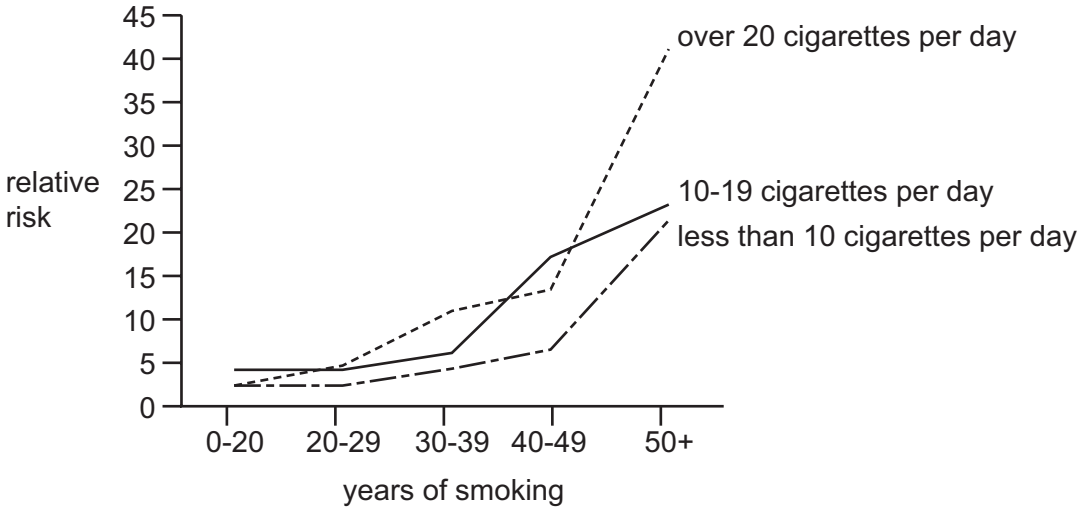
D The upper arm is raised.

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25 The graph shows the relative risk of lung cancer, according to the years of smoking and the number of cigarettes smoked each day.



The following statements were made.

1 The relative risk of lung cancer depends on the number of cigarettes smoked each day.

2 The relative risk of lung cancer depends on the number of years of smoking.

3 The relative risk of lung cancer depends on the tar content of the cigarettes smoked.

Which statements are supported by the data in the graph?

	statement 1	statement 2	statement 3
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

26 Foods can be made by treating milk in different ways.

1 Bacteria are added.

2 The milk is acidified.

3 The milk proteins are coagulated.

Which processes occur in both cheese and yoghurt production?

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

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27 An ocean is polluted by an oil spill.

What is **least** likely to speed up the rate of decomposition of oil by microorganisms?

A aerobic conditions

B mixing by wave action

C presence of salt water

D spraying the surface of the sea with warm water

28 The diagram shows a food chain.

mahogany tree → caterpillar → songbird → hawk

Which type of organism is present in the largest numbers in this food chain?

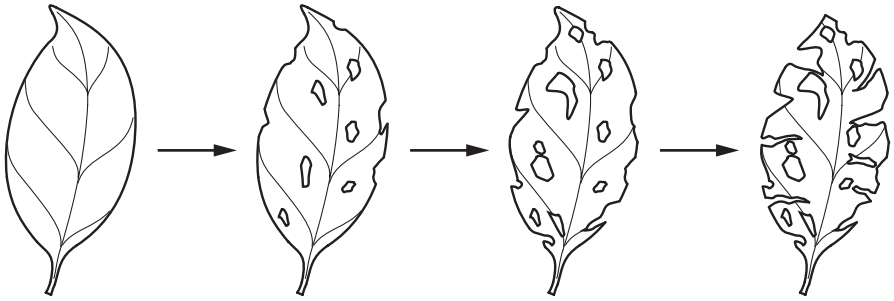
A carnivores

B consumers

C herbivores

D producers

29 The diagram shows changes in the appearance of a leaf over a period of time, as it lies on the damp ground.



Which type of organism is most likely to cause these changes?

A carnivore

B decomposer

C herbivore

D producer

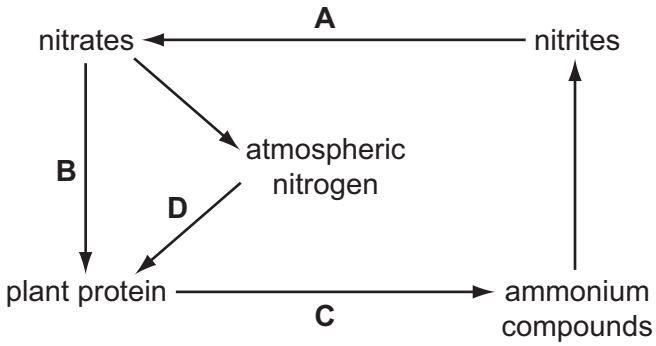
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30 The diagram shows some stages in the nitrogen cycle.

Which arrow represents the action of nitrogen-fixing bacteria?



31 Which method of malarial control is effective against both adult and larval forms of the mosquito?

A covering standing water

B draining swamps

C spraying insecticides

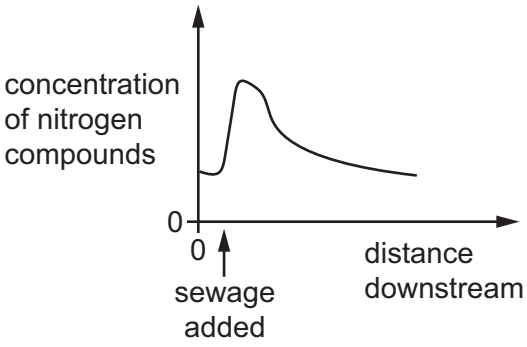
D spraying oil on standing water

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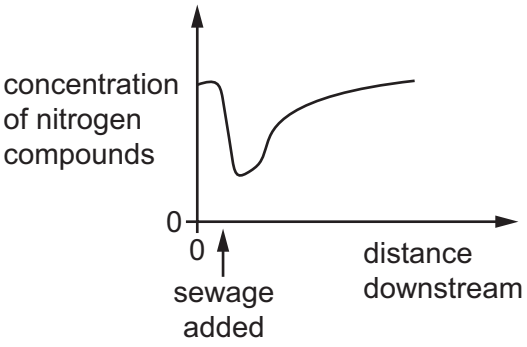
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32 Which graph shows changes that occur in a river after being polluted by sewage?

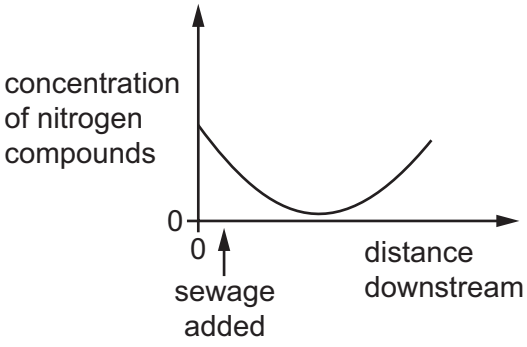
A



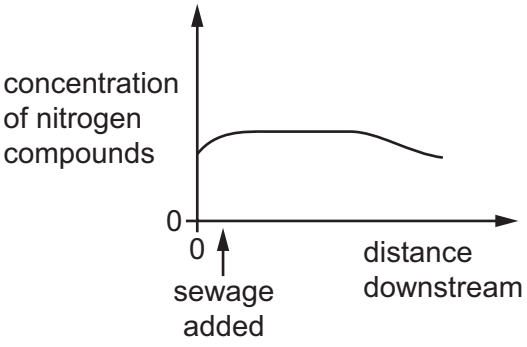
B



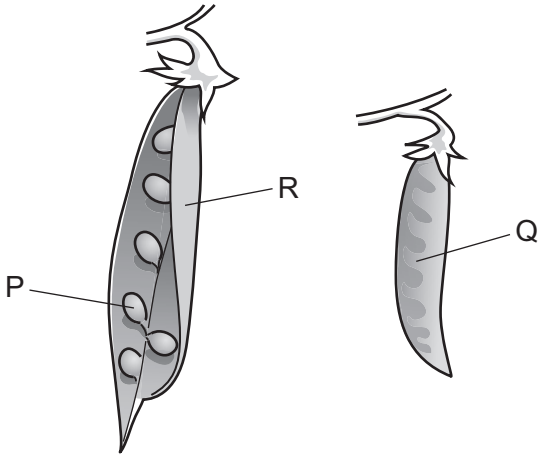
C



D



33 The diagram shows peas growing on the plant.



What are the labelled structures?

	P	Q	R
A	fruit	seed	pericarp
B	fruit	testa	seed
C	seed	fruit	pericarp
D	seed	fruit	testa

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34 What passes down a pollen tube after pollination?

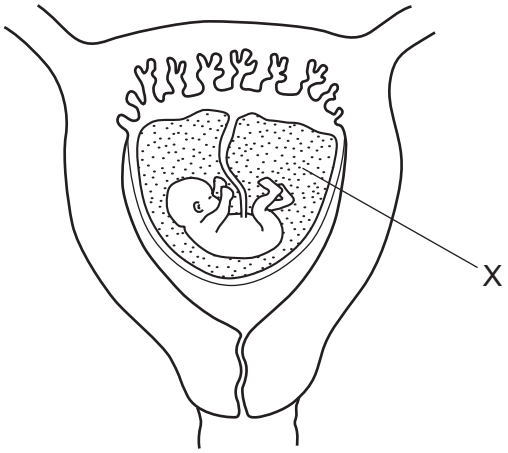
A female nucleus

B male nucleus

C ovule

D pollen grain

35 The diagram shows a developing fetus in the uterus.



What is the function of X?

A absorbing nutrients from the mother's blood

B contracting to push the baby out at birth

C prevention of disease

D protecting from mechanical damage

36 Some signs of syphilis are listed.

1 fever

2 loss of appetite

3 non healing skin ulcers

4 skin rash

5 small, painless sores

6 swelling of lymph nodes

What are the first signs of syphilis?

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

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37 In horses, red hair is dominant to brown.

A breeder crosses a number of heterozygous red-haired horses.

Approximately what percentage of the offspring will be red-haired?

A 25% **B** 50% **C** 75% **D** 100%

38 Which row in the table is correct?

	chromosome in mother's ovum	chromosome in father's sperm	sex of baby
A	X	X	male
B	X	Y	male
C	Y	X	female
D	X	Y	female

39 Which statement is correct?

A Evolution is natural selection.

B Evolution results in natural selection.

C Natural selection and evolution are independent of each other.

D Natural selection results in evolution.

40 Bacteria can be genetically engineered to produce human insulin by adding a human insulin gene to the bacterial DNA.

What is an advantage of this procedure?

A The bacteria do not need a source of glucose.

B The bacteria grow faster than before being engineered.

C The insulin does not need to be purified before being injected into a patient.

D The insulin is unlikely to cause an immune response when injected into a patient.

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