Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2016**

1 hour

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

* 7 0 9 7 8 5 9 7 2 8 *

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.

IB16 06_5090_11/5RP
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1 Which two structures are found in all plant epidermal cells?

A cell wall and chloroplasts

B cell wall and nucleus

C chloroplasts and starch grains

D nucleus and starch grains

2 Which processes can **only** occur through a membrane?

	active transport	diffusion	osmosis
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = yes

✗ = no

3 The small intestine of a person contains a lower concentration of glucose than is present in the blood.

The cells of the villi absorb glucose.

By which process is the glucose absorbed?

A by active transport against the concentration gradient

B by active transport down the concentration gradient

C by diffusion against the concentration gradient

D by diffusion down the concentration gradient

4 X and Y are the reactants in a chemical reaction for which E is the enzyme. The product is Z.

The first three stages in the reaction are shown.

$$X + E \rightarrow XE$$

$$Y + XE \rightarrow XYE$$

$$XYE \rightarrow ZE$$

What is the fourth, and final, stage of this reaction?

A $X + Y + E \rightarrow Z$

B $X + YE \rightarrow Z$

C $Y + ZE \rightarrow YZ + E$

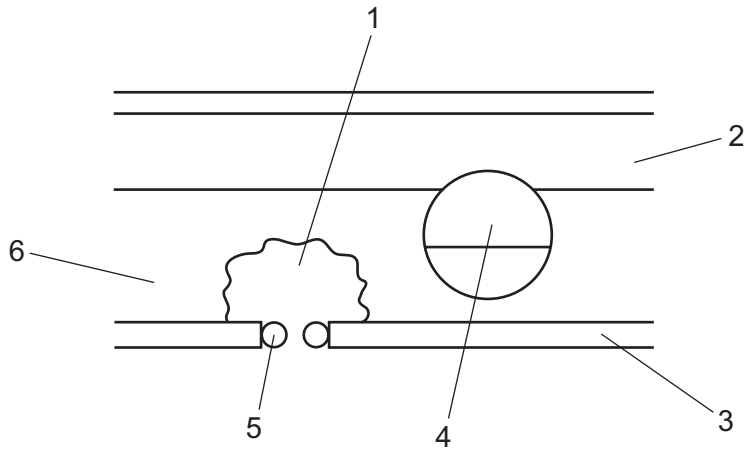
D $ZE \rightarrow Z + E$

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5 Which row shows what happens in photosynthesis?

	energy conversion	immediate product of photosynthesis	storage product of photosynthesis
A	chemical energy to light energy	glucose	starch
B	chemical energy to light energy	starch	glucose
C	light energy to chemical energy	glucose	starch
D	light energy to chemical energy	starch	glucose

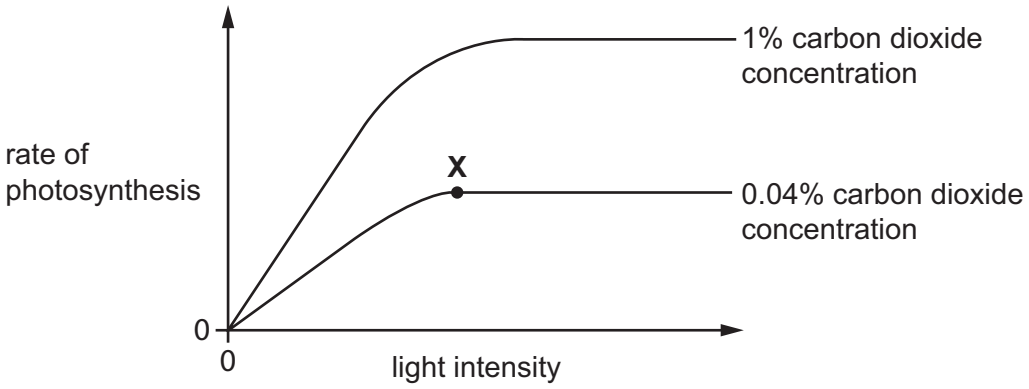
6 The diagram shows a cross-section of a dicotyledonous leaf.



Which labelled parts of the leaf carry out photosynthesis?

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

7 The graph shows how the rate of photosynthesis of a plant varies with light intensity at two different carbon dioxide concentrations. The temperature is kept constant at 20 °C.



Which factor is limiting the rate of photosynthesis at point **X**?

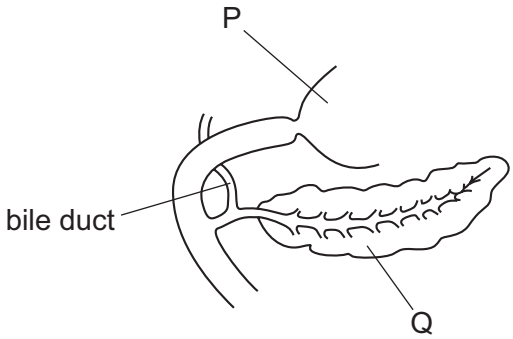
A availability of chlorophyll

B availability of water

C concentration of carbon dioxide

D intensity of light

8 The diagram shows part of the alimentary canal and associated structures.



What are organs P and Q?

	P	Q
A	ileum	gall bladder
B	ileum	pancreas
C	stomach	gall bladder
D	stomach	pancreas

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9 Which statement about chemical digestion in the human alimentary canal is correct?

A Digestion of carbohydrates is completed in the colon.

B Enzymes are secreted to break down cellulose in the duodenum.

C Protein digestion is completed in the ileum.

D The stomach secretes enzymes to break down starch.

10 Which two foods would provide the best sources of carbohydrates, calcium, fibre (roughage) and vitamin C?

A fish and eggs

B green beans and cereal

C meat and milk

D yoghurt and cheese

11 Which statement best describes the movement of water through the stem of a plant?

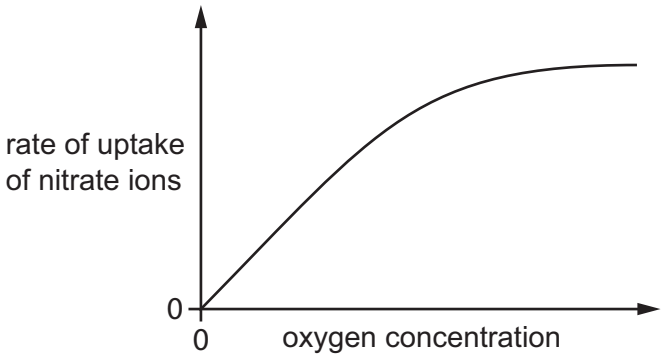
A Water moves up the stem as it evaporates from the leaves.

B Water moves up the stem as it is pushed by water entering the roots.

C Water moves up the stem because it is used in photosynthesis.

D Water moves up the stem by osmosis.

12 The graph shows the effect of oxygen concentration on the uptake of nitrate ions from the soil into a root hair cell.



What can be concluded from this information?

A Nitrate ions enter the root hair cell by active transport.

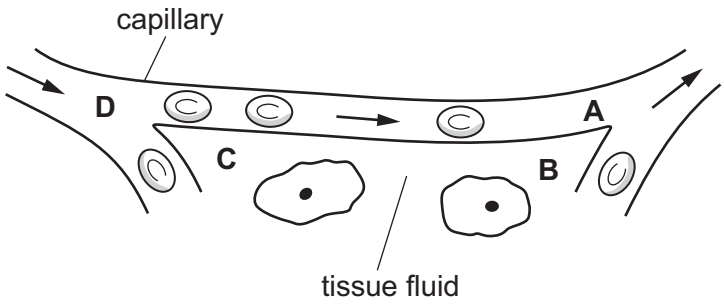
B Nitrate ions enter the root hair cell by osmosis.

C Nitrate ions leave the root hair cell by diffusion.

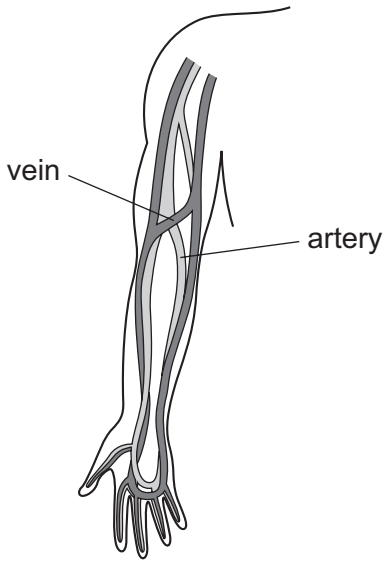
D Nitrate ions leave the root hair cell in low oxygen concentrations.

13 The diagram shows the movement of blood through a tissue.

At which labelled point is the pressure highest?



14 The diagram shows arteries and veins in the human forearm.

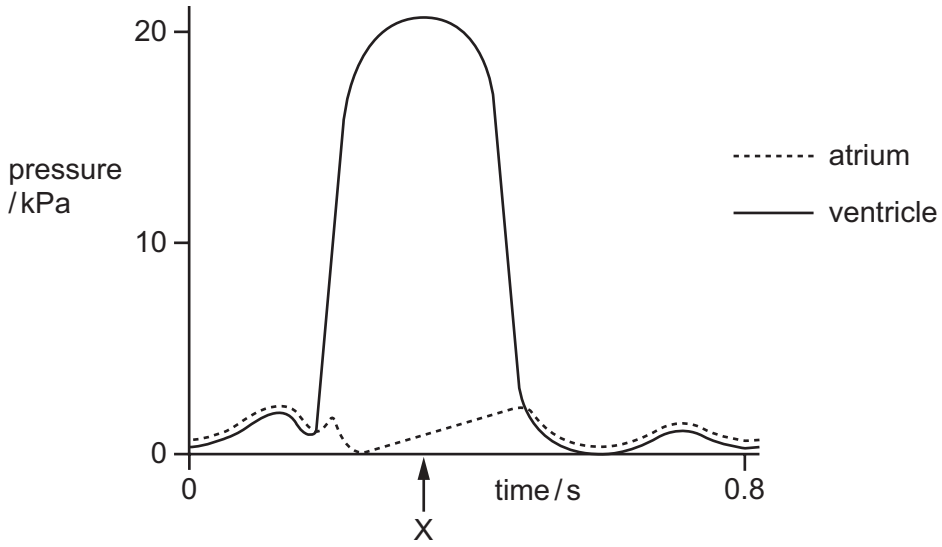


Which statements apply to a vein in the human forearm?

	carries oxygenated blood	has valves	blood is returning to the heart
A	✓	✓	✗
B	✓	✗	✗
C	✗	✓	✓
D	✗	✗	✓

key
✓ = yes
✗ = no

15 The graph shows pressure changes in the left atrium and in the left ventricle during one heartbeat.

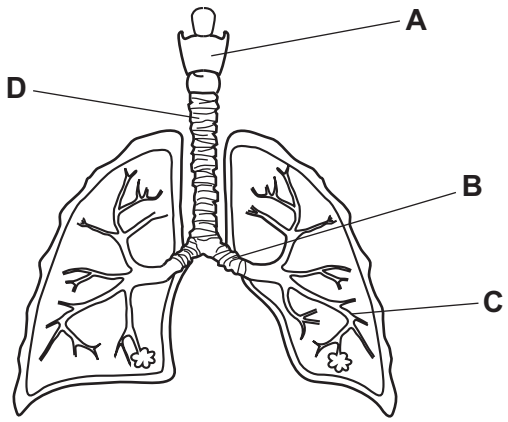


What is the state of the valves in the heart at time X?

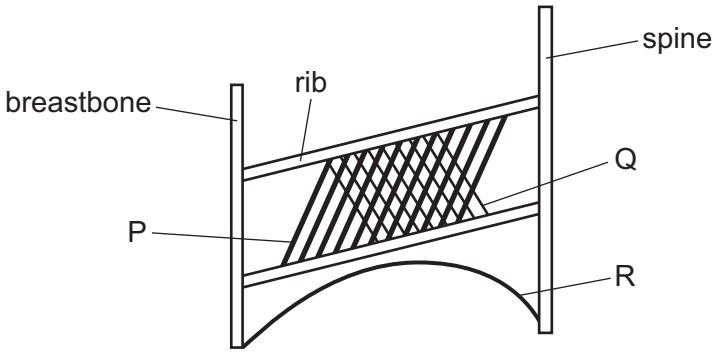
	left atrio-ventricular valve (bicuspid)	semi-lunar valve (in aorta)
A	closed	closed
B	closed	open
C	open	closed
D	open	open

16 The diagram shows the human gas exchange system.

Which structure is the trachea?



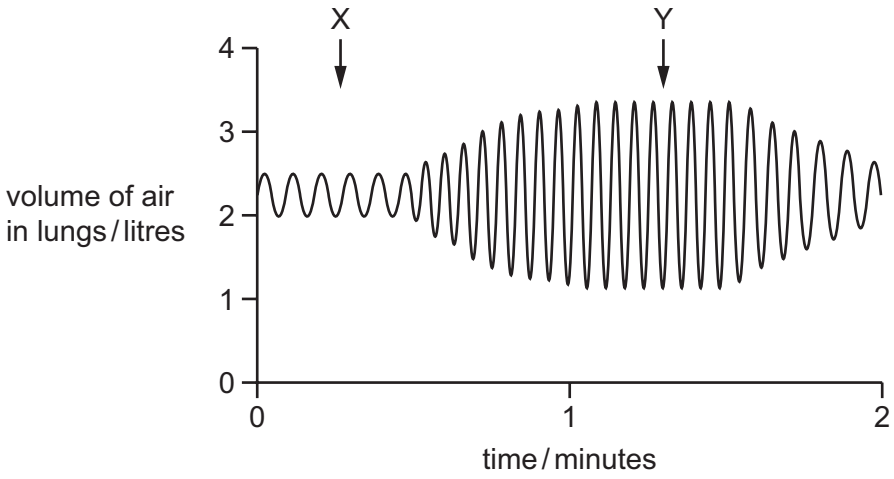
17 The diagram represents some of the muscles involved with breathing.



Which muscles are contracting during breathing in?

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

18 The diagram shows changes in the volume of a person's lungs over a period of two minutes.



What could cause the change in the pattern of the graph between points X and Y?

A changing from running to walking

B changing from walking to running

C increased frequency of contractions of the internal intercostal muscles

D increased strength of contractions of the internal intercostal muscles

19 Which statement about the elbow joint is true?

A If the biceps contracts, the triceps must relax.

B The biceps and triceps can both be partially contracted.

C When the biceps relaxes it returns at once to its original length.

D When the biceps contracts it straightens the arm at the elbow.

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20 During a sunny day, which substance is excreted from a leaf?

A carbon dioxide

B nitrogen

C oxygen

D sucrose

21 Which process is **not** a result of negative feedback?

A A decrease in the surrounding temperature leads to a decrease in respiration rate.

B A decrease in the surrounding temperature leads to a decrease in sweating.

C A decrease in the surrounding temperature leads to a decrease in blood flow through the skin surface.

D A decrease in the surrounding temperature leads to shivering.

22 What is an example of a reflex arc?

A retina → motor neurone → relay neurone → sensory neurone → iris muscle

B retina → motor neurone → sensory neurone → relay neurone → iris muscle

C retina → sensory neurone → motor neurone → relay neurone → iris muscle

D retina → sensory neurone → relay neurone → motor neurone → iris muscle

23 Which structures cover the pupil at the front of a human eye?

A conjunctiva and cornea

B conjunctiva and sclera

C cornea and retina

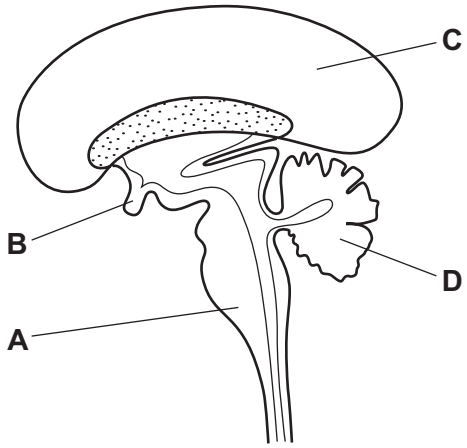
D retina and sclera

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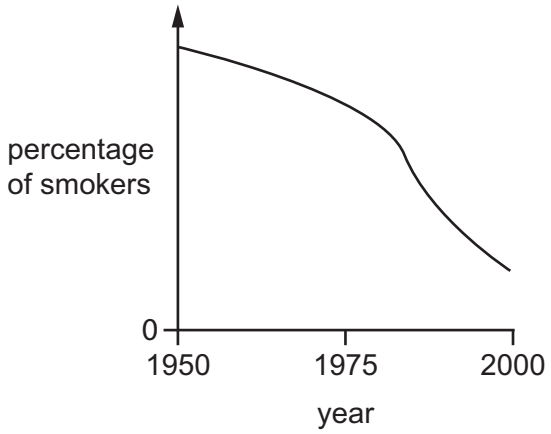
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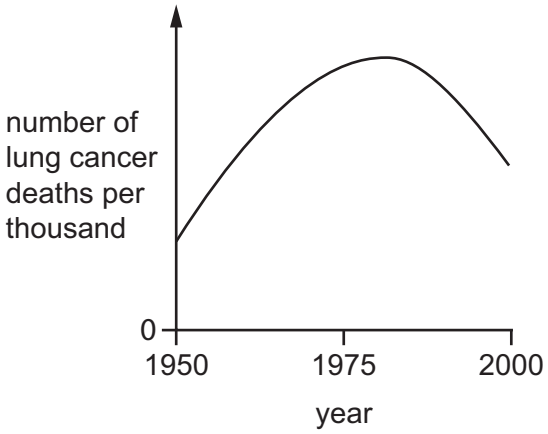
24 The diagram shows a vertical section through the human brain.

Which structure controls balance and muscular coordination?



25 The graphs show changes in the percentage of smokers and number of lung cancer deaths in a country between 1950 and 2000.





What could have caused the change in the number of deaths from lung cancer between 1950 and 1975?

A higher percentage of smokers after 1950

B higher percentage of smokers before 1950

C lower percentage of smokers after 1950

D lower percentage of smokers before 1950

26 Where is penicillin produced?

A in a fungus

B in bacteria

C in the brain

D in the pancreas

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27 During the production of alcohol, why must air be kept out of the fermenter?

A to allow production of carbon dioxide

B to inhibit the growth of yeast

C to prevent aerobic respiration

D to prevent anaerobic respiration

28 Which type of organism depends **directly** on light energy for its nutrition?

A carnivore

B decomposer

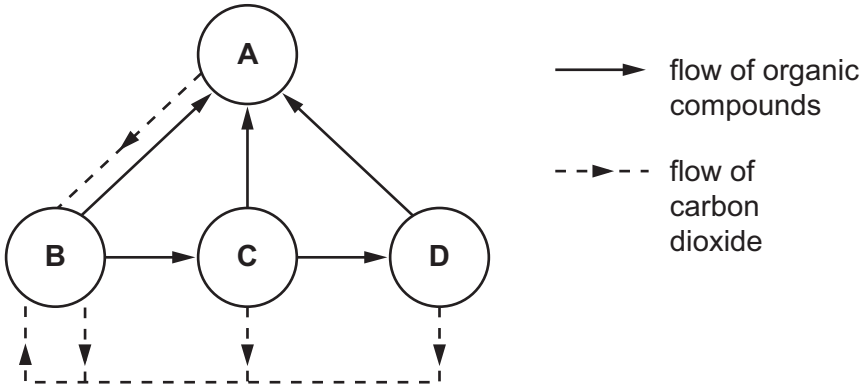
C herbivore

D producer

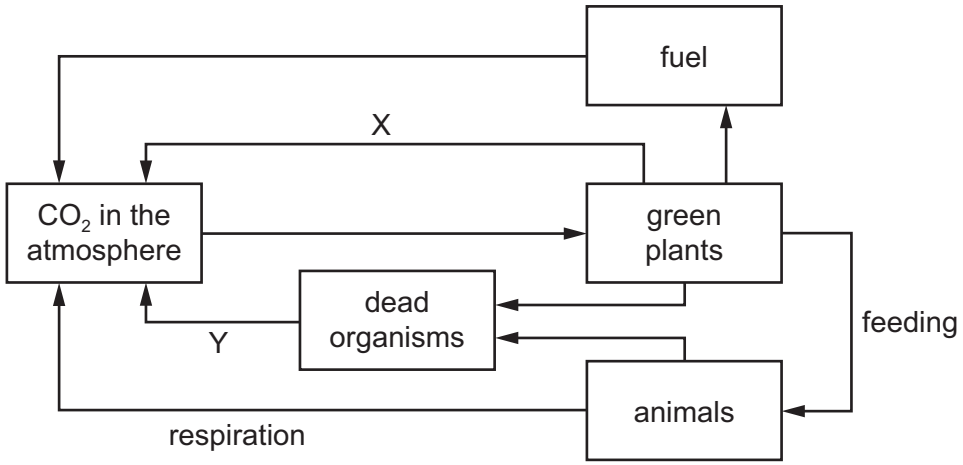
29 The diagram shows the flow of substances within an ecosystem.

The circles represent trophic levels.

Which circle represents herbivores?



30 The diagram shows part of the carbon cycle.



What are the processes X and Y?

	X	Y
A	photosynthesis	decomposition
B	photosynthesis	excretion
C	respiration	photosynthesis
D	respiration	respiration

31 How is malaria usually transmitted from human to human?

A by a bacterium

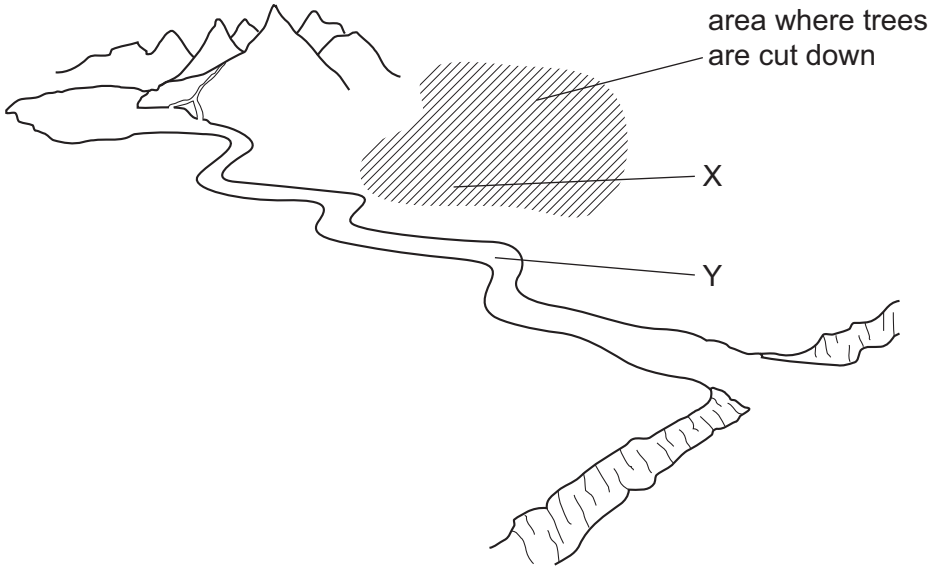
B by a mosquito

C by a pathogen

D by contaminated water

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32 The diagram shows a river that flows down from the mountains to the sea. Trees are cut down and removed from the shaded area.



After a rainstorm, what is the effect on the nitrate ion content at X and at Y?

	nitrate ion content at X	nitrate ion content at Y
A	increases	increases
B	increases	decreases
C	decreases	increases
D	decreases	decreases

33 Which statements describe self-pollination?

	transfer of pollen	two plants required
A	from anther to stigma	yes
B	from anther to stigma	no
C	from stigma to anther	yes
D	from stigma to anther	no

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34 A diploid cell produces further cells with a haploid number of chromosomes.

Which type of cell division is involved and what is the purpose of the cells produced?

	type of cell division	purpose of cells
A	meiosis	asexual reproduction
B	meiosis	sexual reproduction
C	mitosis	asexual reproduction
D	mitosis	sexual reproduction

35 Where does the placenta allow the exchange of materials to take place between mother and fetus?

A oviduct wall

B umbilical cord

C uterus wall

D vagina wall

36 Which row correctly pairs a hormone with its function in the menstrual cycle?

	hormone	function
A	FSH	stimulates release of eggs
B	LH	stimulates release of eggs
C	oestrogen	maintains uterus lining
D	progesterone	repairs uterus lining

37 Genetic engineering can be used to introduce new characteristics into animals and plants.

Which characteristic is **not** likely to be introduced into a cereal crop plant by genetic engineers?

A resistance to bacterial diseases

B resistance to fungal diseases

C resistance to insecticides

D resistance to viral diseases

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38 In the ABO blood group system, which alleles are codominant?

A I^A and I^B

B I^A and I^o

C I^B and I^o

D I^A, I^B and I^o

39 Two black female mice were mated with the same black male. One female had nine offspring, all of which were black. The other female had six black and two white offspring.

Which cross represents the parents of the all black family?

	female	male
A	bb	Bb
B	Bb	Bb
C	Bb	BB
D	BB	Bb

key

B = allele for black

b = allele for white

40 Which statement is evidence that genes are copied and passed on to the next generation?

A Asexual reproduction produces genetically identical offspring.

B Different alleles of a gene can produce variation in phenotype.

C Each species of a plant or animal has a fixed number of chromosomes.

D Sexual reproduction produces genetically different offspring.

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