Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2015**

1 hour

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

1776368222

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 cell wall of a plant cell is removed using an enzyme.

What would happen if this cell is then placed in distilled water?

A It would take longer for the cell to become turgid.

B Proteins in the cytoplasm would leave through the cell membrane.

C The cell would become smaller as water passes out.

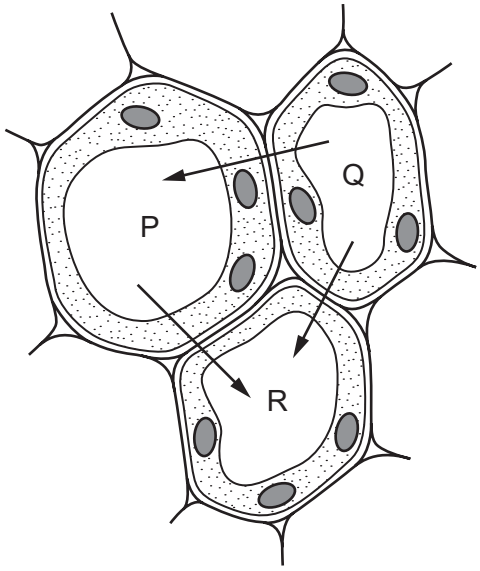
D The cell would burst as water moves into it.

2 Which processes are responsible for the uptake of ions from the soil by a plant and the uptake of glucose into the villi of a human?

	uptake of ions by a plant	uptake of glucose into the villi
A	active transport	active transport
B	active transport	osmosis
C	diffusion	osmosis
D	osmosis	active transport

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3 The diagram shows three plant cells labelled P, Q and R. The arrows show the direction of water movement by osmosis.

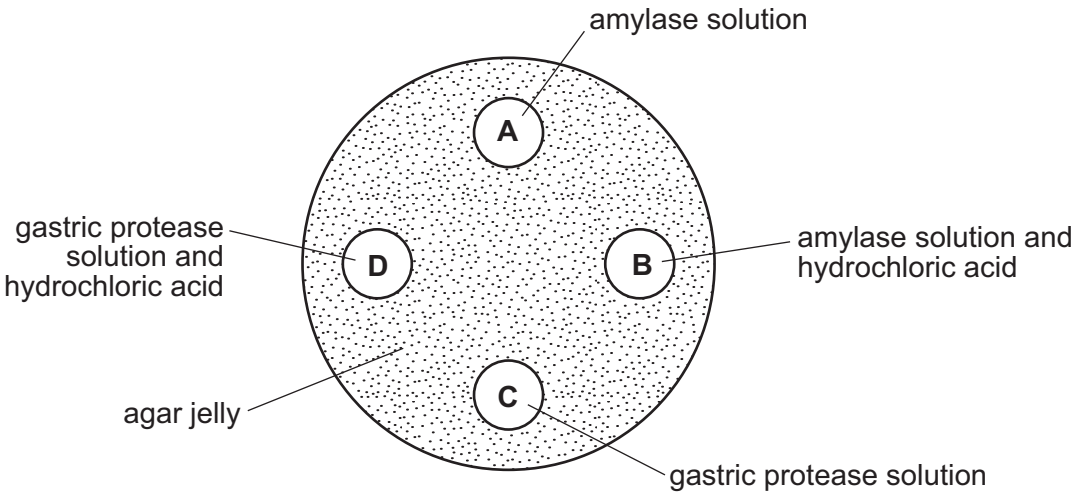


What is the correct order of water potential in the cells, from the highest to the lowest?

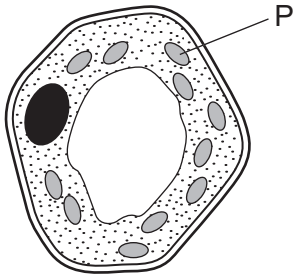
	highest	middle	lowest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	R	P	Q

4 A dish is filled with agar jelly containing starch. Four holes are cut in the jelly and each hole is filled as shown.

After 30 minutes, which hole will be surrounded by the largest area without starch?



5 The diagram shows a plant cell.



Compared with the rest of the cell, which row describes the concentrations of oxygen and magnesium inside structure P during the daytime?

	oxygen	magnesium
A	high	high
B	high	low
C	low	high
D	low	low

6 Some organisms live at the bottom of the seas where it is very dark. To synthesise glucose, they use energy from chemicals in the very hot water that comes out of volcanoes.

What is a distinguishing feature of these organisms?

A Their enzymes are easily denatured by heat.

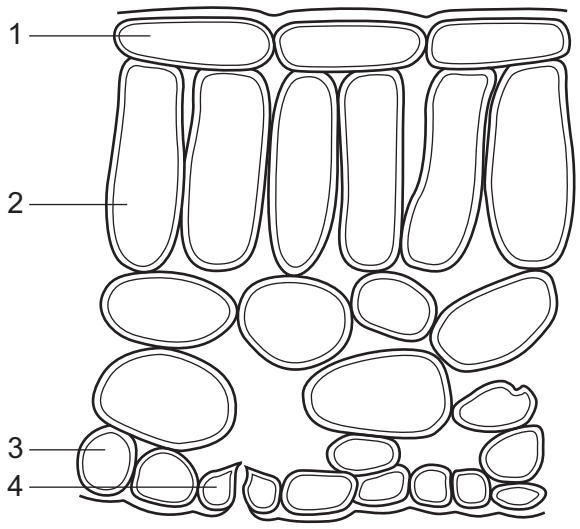
B They do not need carbon dioxide.

C They do not need to be green.

D They obtain energy only as carnivores.

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7 The diagram shows cells in a section through a leaf of a typical green plant.
(No cell contents are shown.)



Which cells usually contain chloroplasts?

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

8 The element nitrogen is needed to form

A fat.

B protein.

C starch.

D sugar.

9 Which process involves the use of nutrients inside cells?

A absorption

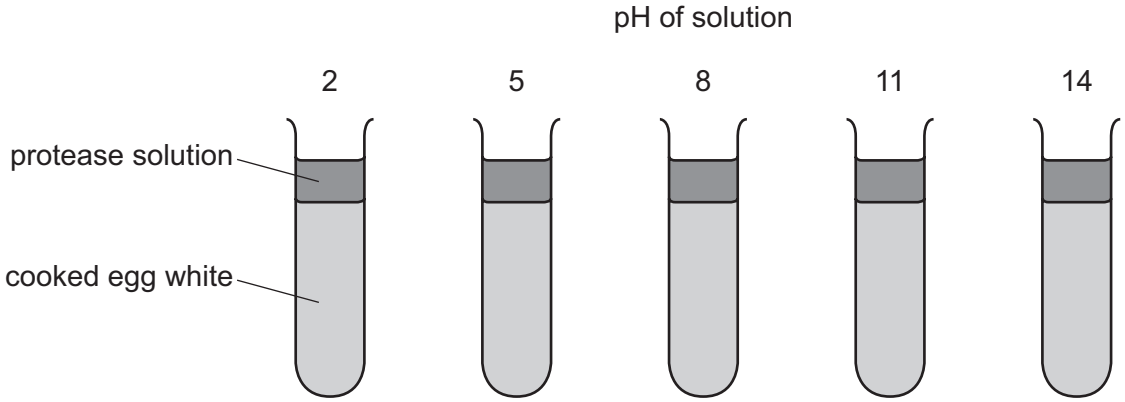
B assimilation

C digestion

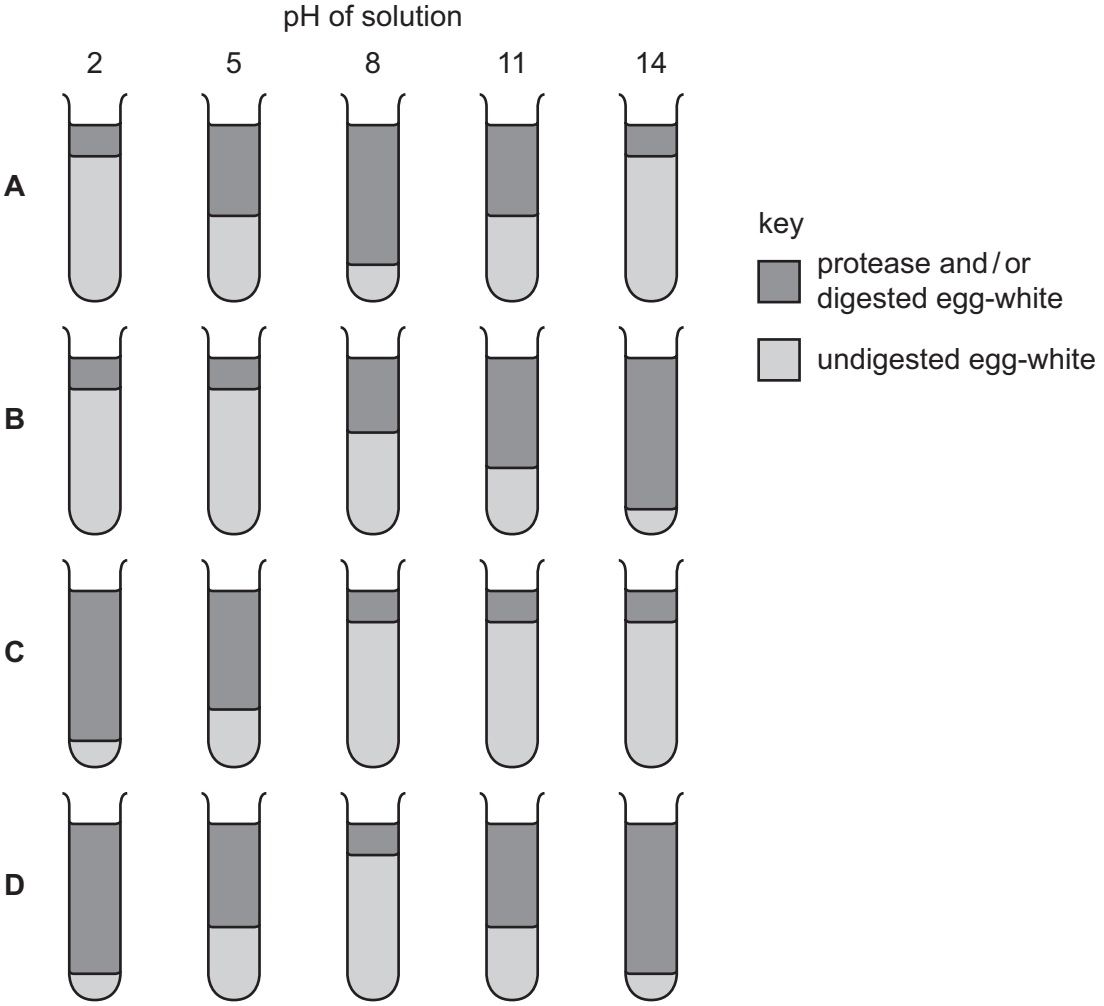
D ingestion

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10 Five tubes containing cooked egg-white are set up as shown. Protease solutions of different pH are added to each tube.



Which diagram shows the results of this experiment for a protease from the stomach?



11 Under which set of conditions will the transpiration rate of a well-watered plant be fastest?

A a cool, dry, windless day

B a cool, rainy, windy day

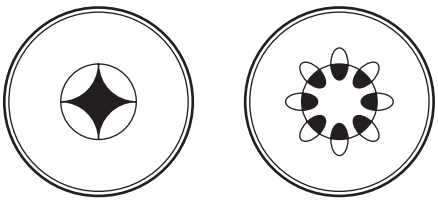
C a hot, dry, windy day

D a hot, rainy, windy day

12 A plant was placed in water containing black dye. After 24 hours the plant was removed and sections were taken from the root and the stem.

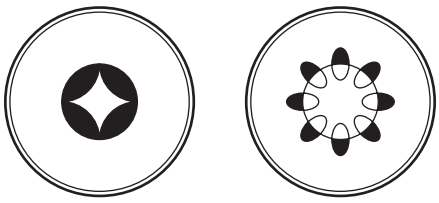
Which diagram shows the results?

A



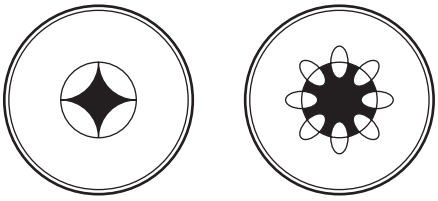
root stem

B



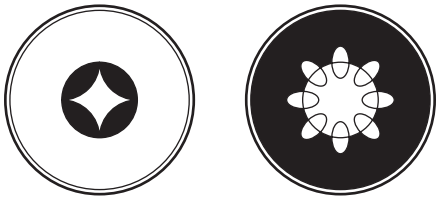
root stem

C



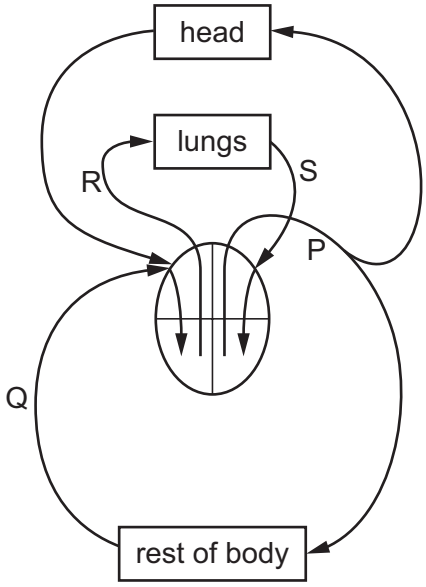
root stem

D



root stem

13 The diagram represents the heart and some major blood vessels.

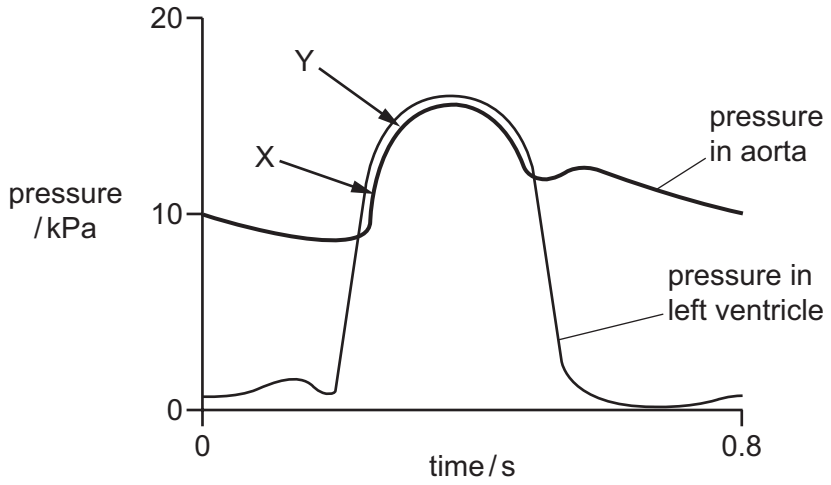


What are possible blood pressures (in kPa) for the vessels shown on the diagram?

	P	Q	R	S
A	1	4	2	16
B	4	16	2	1
C	16	2	4	1
D	16	4	1	2

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14 The diagram shows changes in pressure in the aorta and the left ventricle during one complete heart beat.



What causes the increase in pressure between points X and Y?

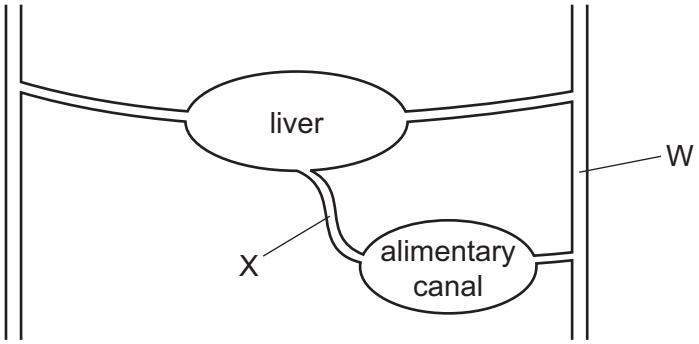
A contraction of the left atrium

B contraction of the left ventricle

C relaxation of the left atrium

D relaxation of the left ventricle

15 The diagram shows the liver and its blood supply.



What is the name of blood vessel X, and which substance increases in concentration between vessel W and vessel X?

	name of X	substance
A	hepatic artery	carbon dioxide
B	hepatic portal vein	carbon dioxide
C	hepatic artery	oxygen
D	hepatic portal vein	oxygen

16 In the equations that follow, [ ] represents energy or an energy-rich compound.

Which equation best represents aerobic respiration?

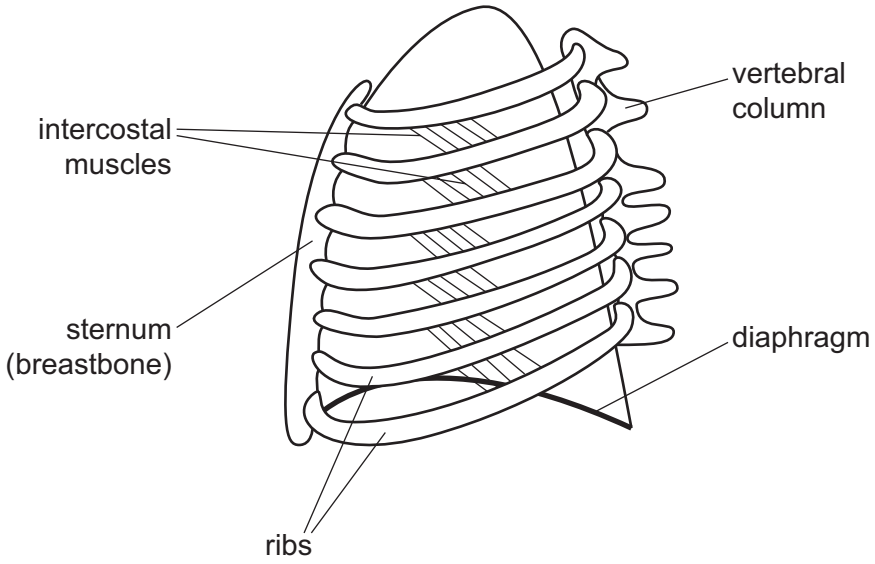
A [energy] + glucose + oxygen → [carbon dioxide] + water

B glucose + [oxygen] → carbon dioxide + water + [energy]

C glucose + [oxygen] → [carbon dioxide] + [water]

D [glucose] + oxygen → carbon dioxide + water + [energy]

17 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.

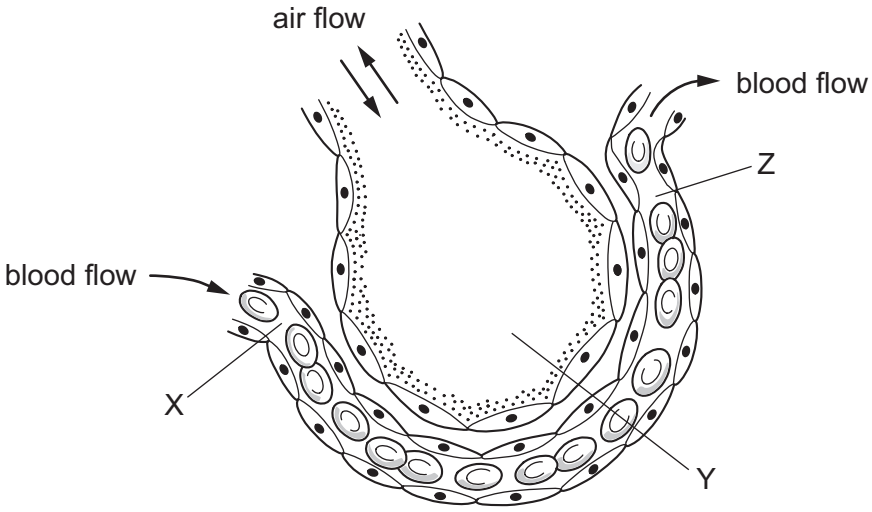
B The lungs inflate.

C The pressure inside the lungs decreases.

D The ribs move down.

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18 The diagram shows a section of an alveolus and a capillary in a lung.



What are the relative concentrations of **carbon dioxide** at X, Y and Z?

	X	Y	Z
A	high	high	high
B	high	low	low
C	low	high	high
D	low	high	low

19 Where are most nitrogen compounds excreted from humans?

A kidneys

B liver

C rectum

D skin

20 When the temperature of the air is higher than body temperature, which of these control mechanisms can help to maintain a constant body temperature?

	constriction of blood vessels in skin	shivering	sweating
A	✓	✓	✓
B	✓	✗	✗
C	✗	✓	✗
D	✗	✗	✓

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[Turn over

21 A motor neurone transmits impulses from

A muscle to spinal cord.

B receptor to muscle.

C receptor to spinal cord.

D spinal cord to muscle.

22 In which order does light pass through these structures in the eye?

A cornea → aqueous humour → lens → vitreous humour → retina

B cornea → vitreous humour → lens → aqueous humour → retina

C lens → aqueous humour → cornea → vitreous humour → retina

D lens → vitreous humour → cornea → aqueous humour → retina

23 Why is glucose found in the urine of diabetics?

A increased uptake and use of glucose by the body cells

B not enough glucose in the blood is converted to glycogen

C stored fats in the body are being oxidized

D too much glucose is absorbed by the kidney cells

24 Which bones form a joint at the shoulder?

A humerus and scapula

B humerus and ulna

C radius and ulna

D radius and scapula

25 Which facts about alcohol are correct?

	acts as a depressant	broken down by the liver	increases self-control
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✗

key

✓ correct

✗ not correct

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26 In a practical lesson, a student makes the following observations about some organisms.

'They are spherical, unicellular organisms which are visible with the light microscope.

Diameter is 0.01 mm. Cytoplasm is present and, after staining, a nucleus can be seen.

A vacuole is present.'

What is being described?

A bacterium

B fungus

C plant

D virus

27 The fungus *Penicillium* is grown in fermenters to make penicillin. The table shows the time taken for the mycelium of the fungus to double in size with different types of carbohydrate. All other conditions were kept constant.

type of carbohydrate	glucose	maltose	starch
time for mycelium of *Pencillium* to double in size / hours	15	20	30

What can be concluded from the data?

A Glucose molecules are larger than maltose molecules.

B *Penicillium* does not produce amylase.

C *Penicillium* does not produce protease.

D *Penicillium* takes longer to use starch than to use sugars.

28 Which sequence describes the flow of energy in an ecosystem?

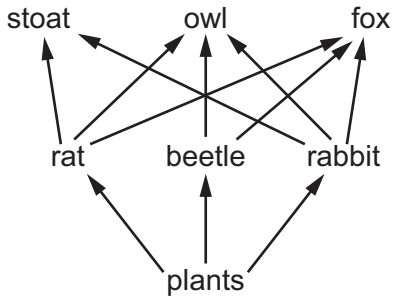
A carnivore → herbivore → plant → Sun

B plant → herbivore → carnivore → Sun

C Sun → carnivore → herbivore → plant

D Sun → plant → herbivore → carnivore

29 The diagram shows a food web.



What is likely to happen to the owl population if foxes die out?

A It will decrease because there will be more competition with stoats for food.

B It will increase because there will be more rats, beetles and rabbits for them to eat.

C It will stay the same because owls do not eat foxes.

D It will stay the same because stoats will eat less food.

30 Which organisms convert ammonium compounds to nitrates?

A decomposing bacteria

B decomposing fungi

C nitrifying bacteria

D nitrogen-fixing bacteria

31 The malarial parasite can be transferred from mosquitoes to humans when

A humans swim in lakes containing mosquito larvae.

B female adult mosquitoes feed.

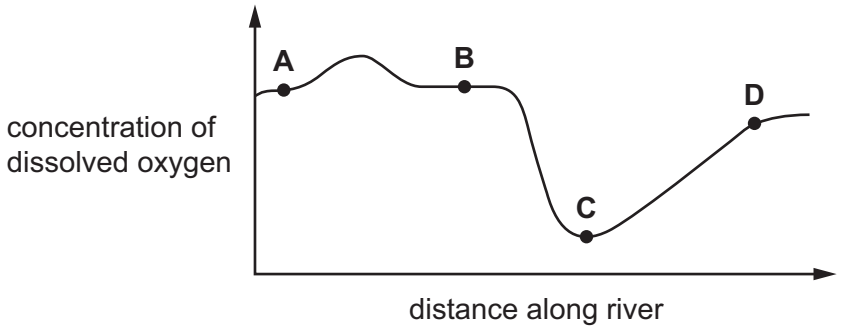
C mosquito larvae contaminate drinking water.

D mosquitoes lay eggs near places where humans live.

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32 The graph shows the concentration of dissolved oxygen at different points along a river.

At which point is sewage emptied into the river?



33 What describes the chromosome number of these human cells?

	egg-producing cell in ovary	sperm	zygote	cell in an embryo
A	diploid	diploid	haploid	haploid
B	diploid	haploid	diploid	diploid
C	diploid	haploid	haploid	diploid
D	haploid	haploid	diploid	diploid

34 A plant has flowers whose anthers mature and fall off before the stigma is fully developed.

What will this prevent?

A cross-pollination

B insect-pollination

C self-pollination

D wind-pollination

35 Which diseases can be cured with antibiotics?

	lung cancer	HIV infection	syphilis
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = can be cured with antibiotics

✗ = cannot be cured with antibiotics

36 Which row correctly shows an advantage of feeding babies breast milk and an advantage of feeding them bottle milk?

	advantage of breast feeding	advantage of bottle feeding
A	Feeding helps create a bond between mother and baby.	Bottle feeding is cheaper.
B	It is easier to control the amount of milk the baby receives.	Other people besides the mother can feed the baby.
C	The baby receives antibodies from the mother.	The baby is less likely to suffer from diarrhoea.
D	The milk contains exactly the right balance of nutrients.	HIV is less likely to be transmitted from mother to baby.

37 Which of these may be heterozygous?

A a haploid cell

B an allele of a gene

C an organism with a dominant phenotype

D an organism with a recessive genotype

38 A red-flowered plant is crossed with a white-flowered plant. All the offspring have red flowers.

What is the genotype of these offspring?

A RR and Rr **B** RR only **C** Rr only **D** rr only

39 A person with Down's syndrome is born with 47 chromosomes in each cell, instead of 46.

What could cause this?

A A mutation happened during the production of the egg cell.

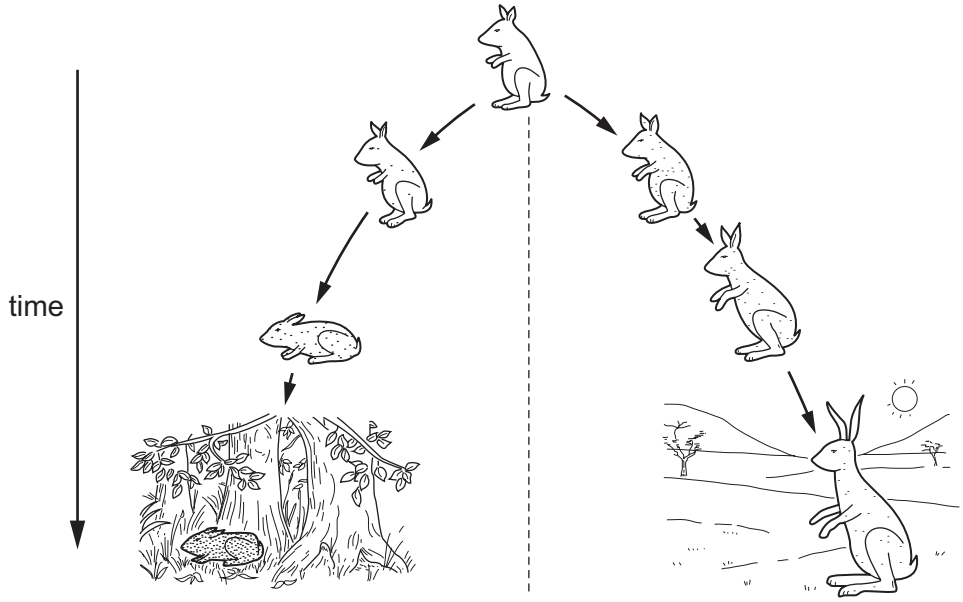
B More than one sperm fused with the egg at fertilisation.

C Radiation caused a change in structure of a gene in the father's sperm.

D The mother was exposed to harmful chemicals while she was pregnant.

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40 The diagram shows a species becoming modified to survive in two different habitats.



Which process is responsible for these modifications?

A artificial selection

B conservation

C genetic engineering

D natural selection

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