Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/12**

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)

9173239257

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.

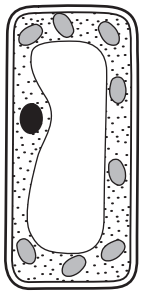
There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**.
Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

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.

IB15 06_5090_12/5RP
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1 The diagram shows a plant cell.



Which structure identifies this as a plant cell rather than an animal cell?

A cell membrane

B cell wall

C cytoplasm

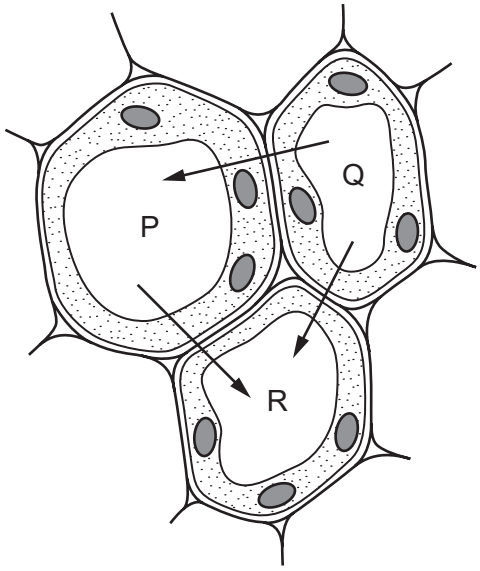
D nucleus

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.

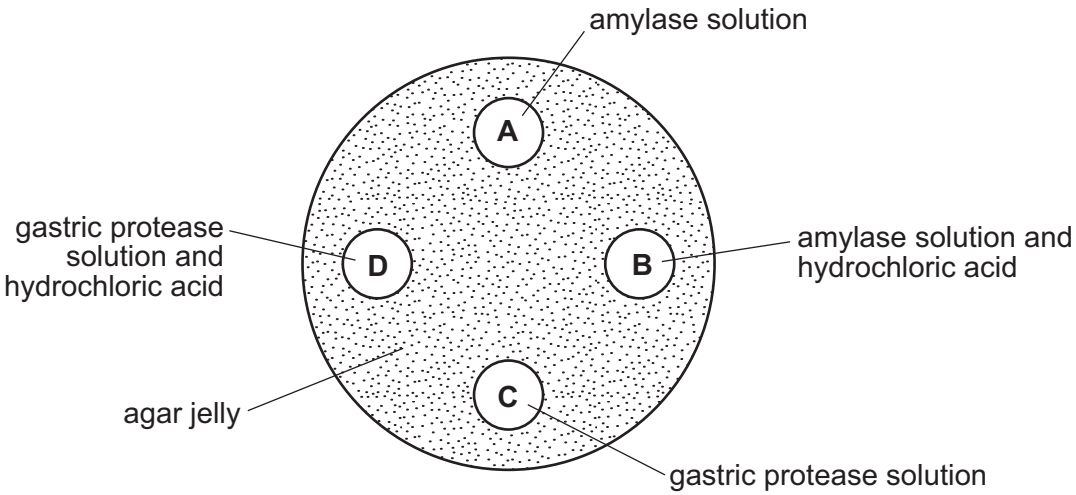


What is the correct order of water potential in the cells, from the highest to the lowest?

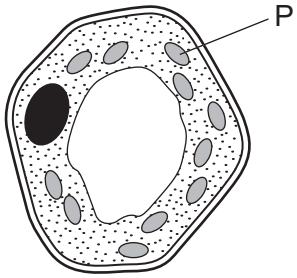
	highest	middle	lowest
A	P	Q	R
B	P	R	Q
C	Q	P	R
D	R	P	Q

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.



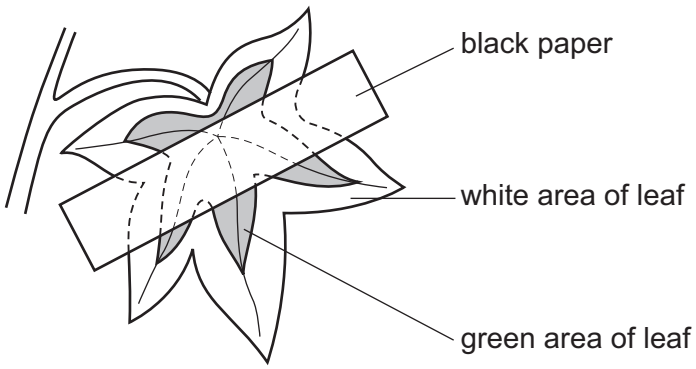
Compared with the rest of the cell, which row describes the concentrations of oxygen and magnesium inside structure P during the daytime?

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

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6 A plant has leaves that are green in the centre but white around the edges.

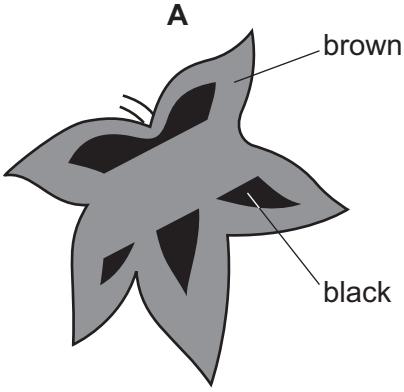
The plant is destarched and then has one of its leaves partly covered with black paper on both sides of the leaf, as shown.



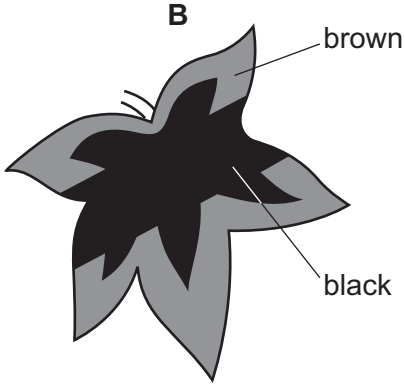
The plant is placed in bright light for 48 hours. The leaf is then tested for starch.

Which diagram shows the colours that are obtained?

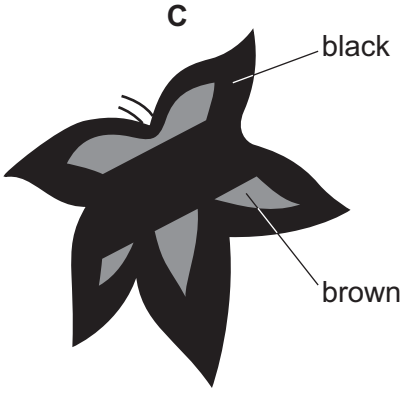
A



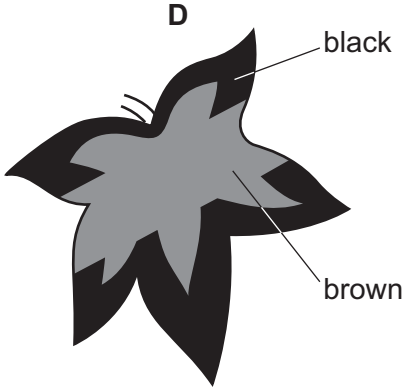
B



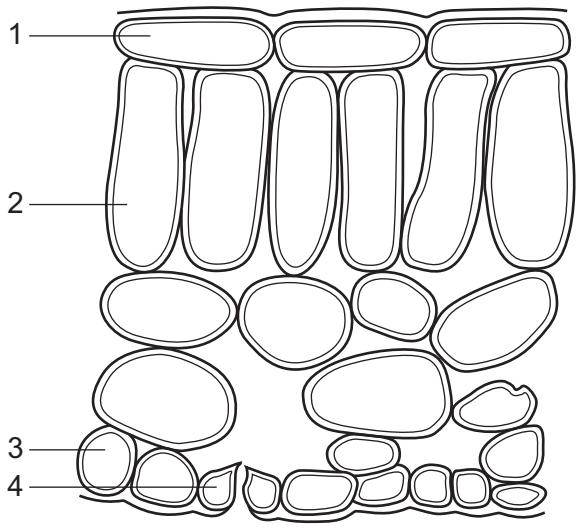
C



D



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 What is an example of assimilation?

A absorption of glycerol into lacteals

B breakdown of alcohol in the liver

C building of proteins from amino acids

D release of a hormone from a gland

9 What are the basic units from which glycogen is synthesised?

A amino acids

B fatty acids

C glucose

D glycerol

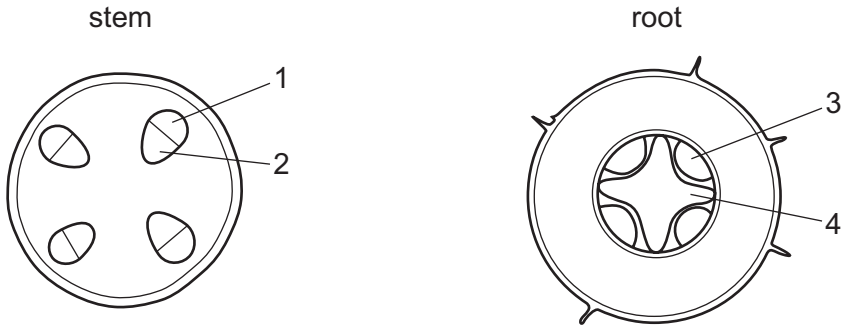
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10 A food is known to contain protein, but no reducing sugar.

When this food is tested with biuret solution and Benedict's solution which colours would a student observe?

	biuret test	Benedict's test
A	blue	blue
B	blue	brick red
C	lilac / violet	blue
D	lilac / violet	brick red

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



Which regions contain xylem vessels?

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

12 In an experiment to investigate transpiration, the leaves of four identical shoots are treated as follows.

1 upper surfaces covered with waterproof jelly

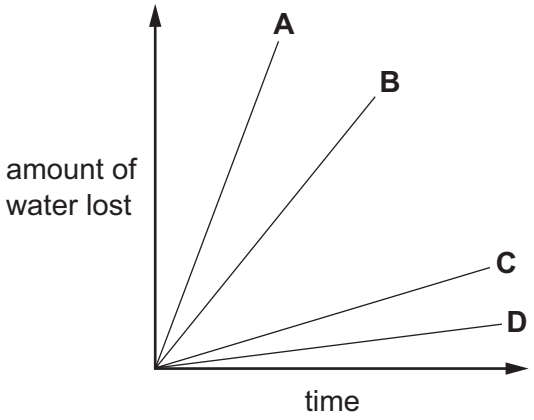
2 lower surfaces covered with waterproof jelly

3 upper and lower surfaces covered with waterproof jelly

4 untreated

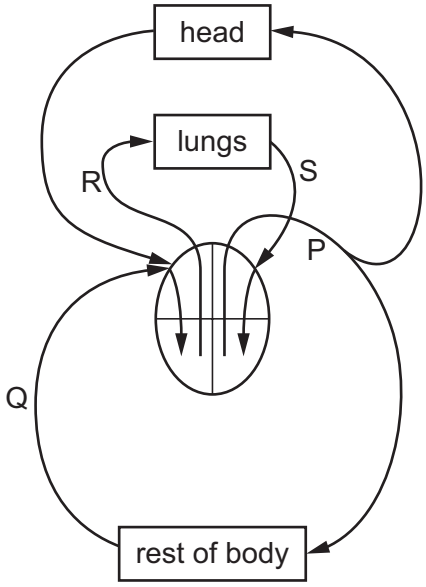
The graph shows the water lost by the four shoots.

Which line shows the result for shoot 4?



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



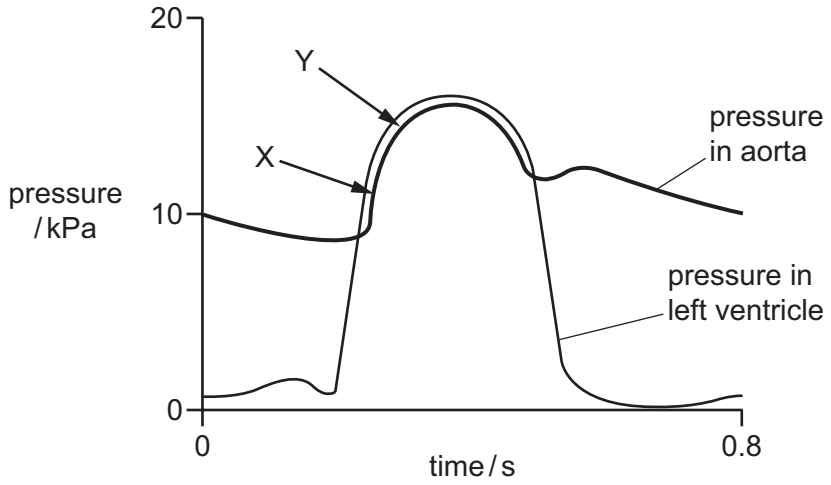
What are possible blood pressures (in kPa) for the vessels shown on the diagram?

	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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[Turn over

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?

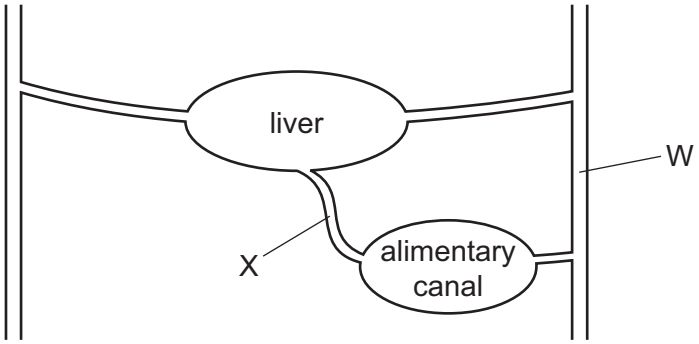
A contraction of the left atrium

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

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16 Which word equation shows anaerobic respiration in yeast?

A glucose → ethanol

B glucose → ethanol + carbon dioxide

C glucose → lactic acid

D glucose → lactic acid + carbon dioxide

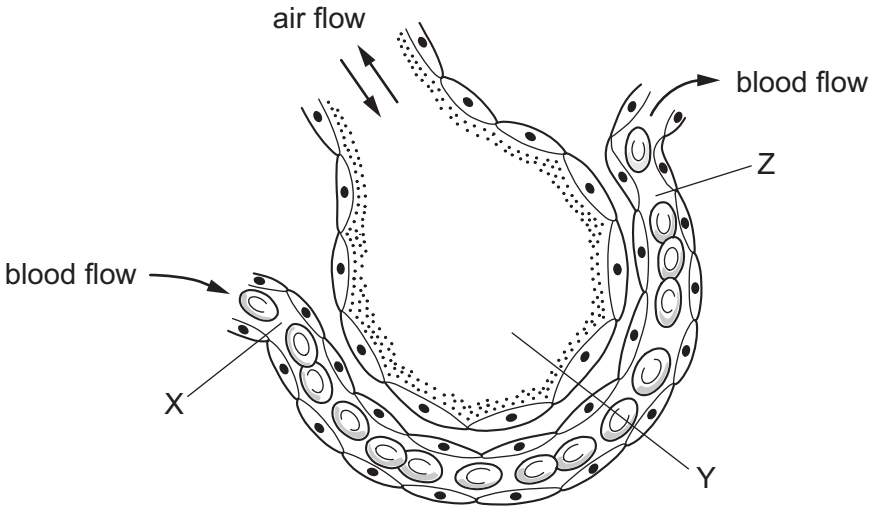
17 The table shows the effect of exercise on the rate and depth of breathing.

	breathing rate / breaths per minute	volume of each breath / cm^3
at rest	12	500
after exercise	24	1000

What is the increase in the volume of air exchanged per minute after exercise, compared to at rest?

A 1000 cm^3 **B** 6000 cm^3 **C** 18 000 cm^3 **D** 24 000 cm^3

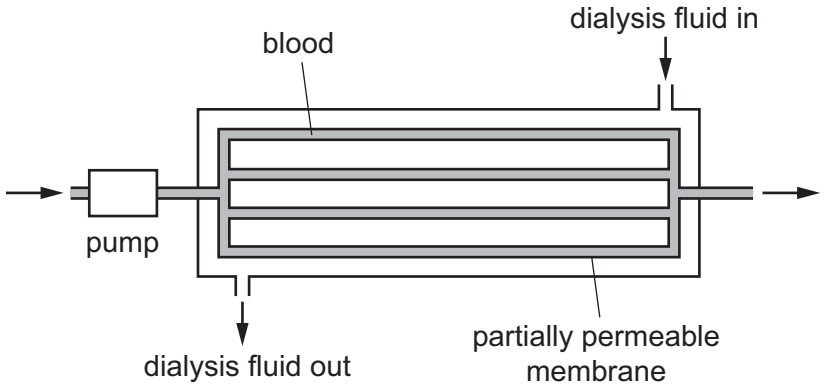
18 The diagram shows a section of an alveolus and a capillary in a lung.



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 The diagram represents a kidney machine.



Which two substances are both present in the dialysis fluid entering the machine?

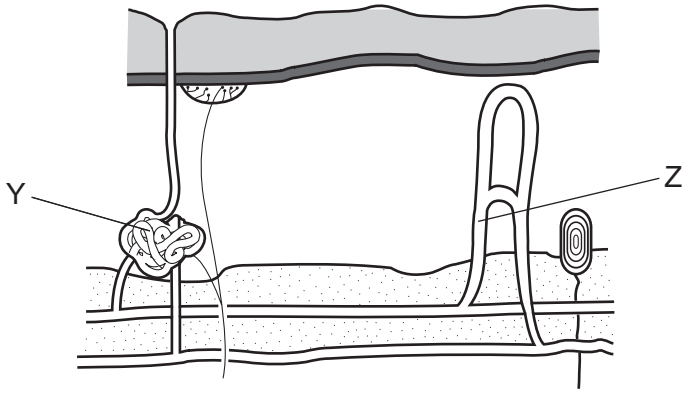
A glucose and protein

B glucose and salts

C protein and urea

D urea and salts

20 The diagram shows some of the structures in human skin.



Which labels describe the structures Y and Z in hot conditions?

	Y	Z
A	active	constricted
B	active	dilated
C	inactive	constricted
D	inactive	dilated

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21 What are characteristics of all neurones?

	carry information within the brain	stimulate muscles or glands	transmit electrical impulses
A	✓	✓	✗
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

22 An antelope is grazing under a tree. It hears men shouting in the distance.

Which changes take place in the antelope's eyes as it raises its head to look at the men?

	ciliary bodies	suspensory ligaments	lenses
A	contract	become taut	become more convex
B	contract	become slack	become less convex
C	relax	become taut	become less convex
D	relax	become slack	become more convex

23 A patient complains to the doctor of unexplained weight loss, severe thirst and frequent need of urination.

A test shows high levels of glucose in the urine.

Which condition does the doctor diagnose?

A cardiovascular disease

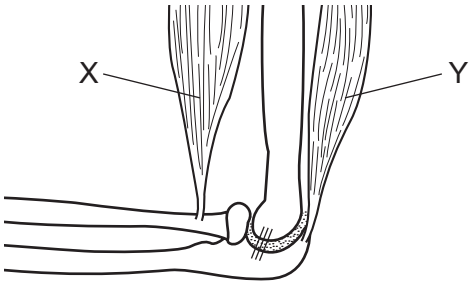
B diabetes

C kidney failure

D obesity

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24 The diagram shows part of the elbow joint.



Why are the muscles labelled X and Y described as antagonistic?

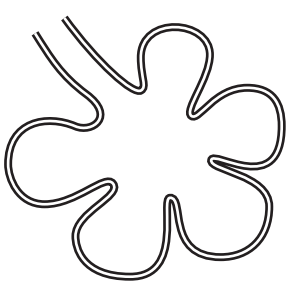
A They both affect the same bone.

B They have the same bending effect on two different bones.

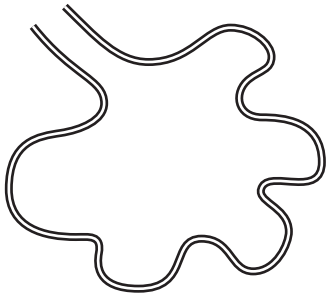
C They have opposite effects on the same joint.

D They have opposite effects on different joints.

25 The diagrams show the structure of the alveoli in the lungs of a normal person and in a smoker with emphysema.



normal



emphysema

What is the effect of emphysema?

A increased chance of lung cancer

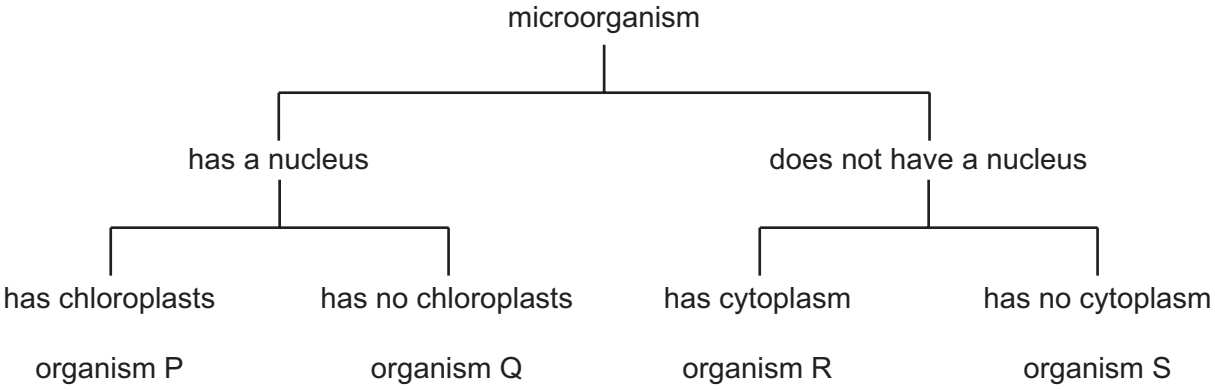
B inflammation of the walls of the airways

C less difficulty in breathing in and out

D less efficient gaseous exchange

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26 A student examined four different microorganisms. She noted whether the microorganisms had a nucleus, chloroplasts and cytoplasm. She constructed the table below to identify the microorganisms.

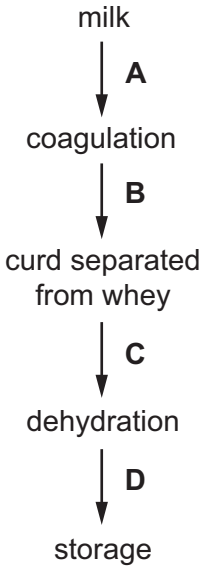


What are organisms Q, R and S?

	Q	R	S
A	bacterium	virus	fungus
B	bacterium	virus	plant
C	fungus	bacterium	virus
D	fungus	bacterium	plant

27 The diagram shows some of the stages in cheese production.

At which stage in the production of cheese are bacteria added?



28 Some types of bacteria make carbohydrates from carbon dioxide and water using the energy from sunlight.

Which of the following describes these bacteria?

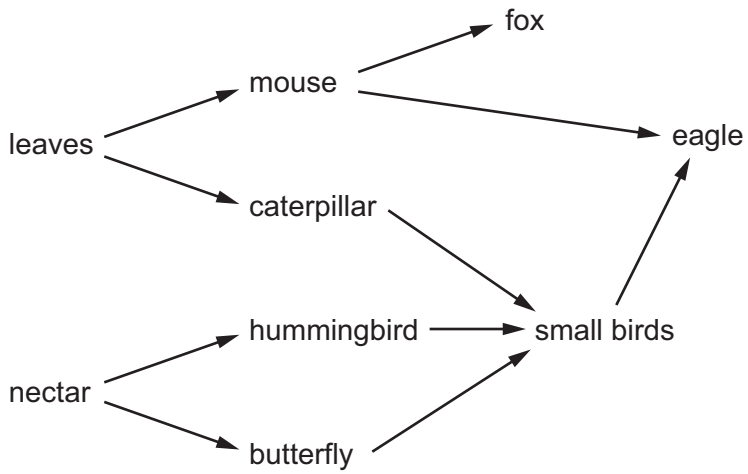
A carnivores

B decomposers

C herbivores

D producers

29 The diagram shows a food web.



Which statement about this food web is correct?

A Eagles obtain their energy from foxes.

B If the hummingbirds all die the caterpillars will have more food.

C Part of this food web is the food chain: nectar → caterpillar → small birds

D The small birds are carnivores.

30 How do nitrogen-fixing bacteria improve soil fertility?

A They convert nitrates to nitrites.

B They convert nitrites to nitrates.

C They release nitrogen gas from nitrates.

D They use nitrogen gas to make nitrogen-containing compounds.

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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.

32 Which row shows a cause and an effect of eutrophication?

	cause	effect
A	the overuse of insecticides	an algal bloom in ponds and streams
B	the release of fertilisers	acidification of the atmosphere
C	the release of oxides of nitrogen	warming of the atmosphere
D	the release of sewage	anaerobic conditions in ponds and streams

33 A male gamete leaves the pollen tube immediately after the pollen tube has entered which structure?

A ovary

B ovule

C stigma

D style

34 What is always essential for seeds to begin germinating?

A carbon dioxide

B light

C mineral salts

D oxygen

35 Which diseases can be cured with antibiotics?

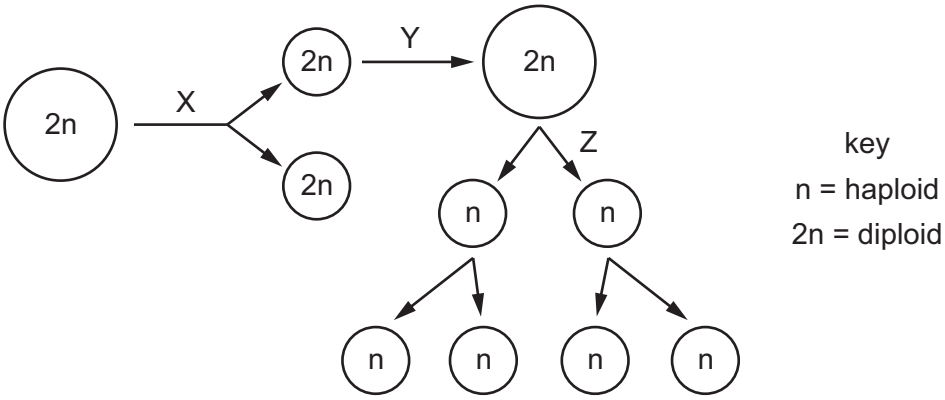
	lung cancer	HIV infection	syphilis
A	✓	✓	✓
B	✓	✗	✓
C	✗	✓	✗
D	✗	✗	✓

key

✓ = can be cured with antibiotics

✗ = cannot be cured with antibiotics

36 The diagram shows some cells in the life cycle of an animal.



Which processes are occurring at X, Y and Z?

	X	Y	Z
A	maturation	meiosis	mitosis
B	meiosis	maturation	mitosis
C	mitosis	maturation	meiosis
D	mitosis	meiosis	maturation

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 Over time, a species of bird develops a more pointed beak. The more pointed shape of the beak helps the birds to catch small insects that may be hiding in cracks in the rocks.

What is a reason for the change in the shape of the birds' beaks?

A Birds develop more pointed beaks as they search for insects in cracks in the rocks.

B Individuals with less pointed beaks are better fitted to their environment and more likely to survive.

C Individuals with more pointed beaks are better able to compete for food.

D When reproducing, birds are more likely to seek out mates with less pointed beaks because these are better adapted.

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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.

40 Bacteria can be genetically engineered to produce human insulin.

Before this method was developed, the only insulin available was that from cattle or pigs. It was obtained from extracts of animal pancreas.

Which statements about the two methods are correct?

W Large numbers of bacteria can be cultured in a small space.

X Bacteria reproduce very quickly and make insulin quickly.

Y People sometimes develop diseases from insulin taken from cows or pigs.

Z The insulin produced in bacteria is not the same as that produced in the human pancreas.

A W, X and Y **B** W, X and Z **C** W, Y and Z **D** X, Y and Z

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