Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **May/June 2020**

1 hour

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.

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1 Which structure is present in a liver cell and in a leaf cell?

A cell wall

B chloroplast

C cytoplasm

D sap vacuole

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

A active transport

B diffusion

C osmosis

D translocation

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 concentrations of sugar solution.

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 cells.

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 Which property of enzymes is explained by the lock and key hypothesis?

A All enzymes are proteins.

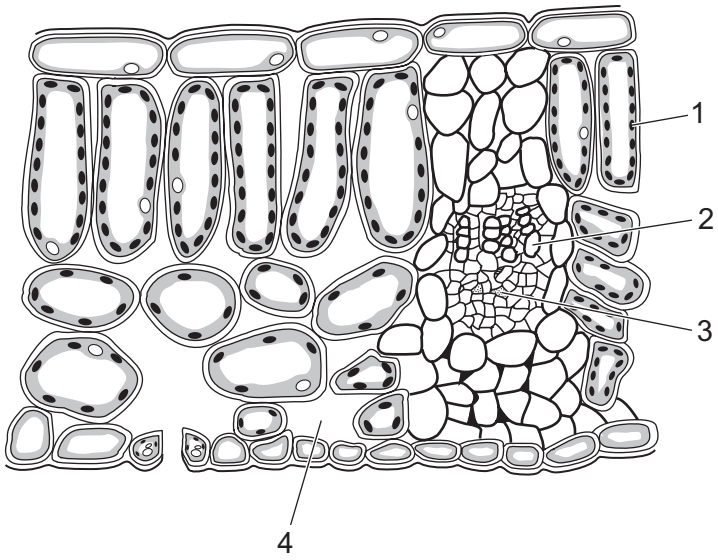
B Enzymes are inactive at very low temperatures.

C Human enzymes are most active just below 40 °C.

D Most enzymes can catalyse only one reaction.

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5 The diagram shows a transverse section through a leaf.



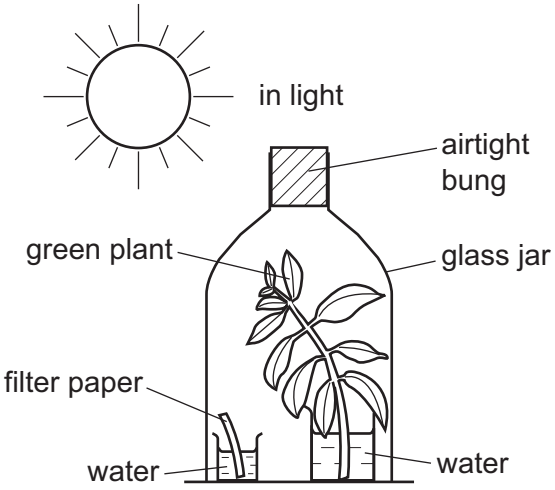
What are the functions of the parts labelled 1, 2, 3 and 4?

	1	2	3	4
A	gaseous exchange	transporting sucrose	transporting water	photosynthesis
B	gaseous exchange	transporting water	transporting sucrose	photosynthesis
C	photosynthesis	transporting sucrose	transporting water	gaseous exchange
D	photosynthesis	transporting water	transporting sucrose	gaseous exchange

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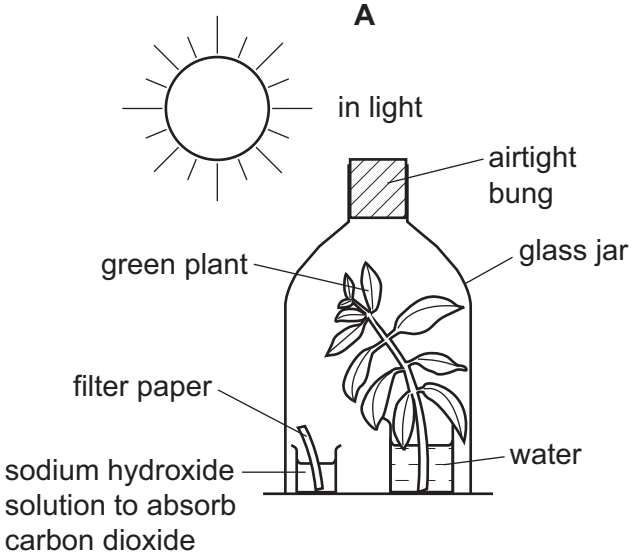
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6 The diagram shows a green plant photosynthesising under a glass jar. This was used as a control experiment in a laboratory investigation.

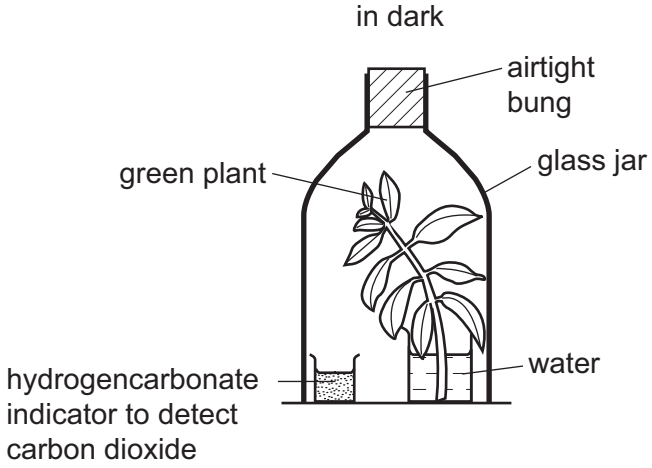


Which diagram shows the experiment carried out to investigate the need for carbon dioxide in photosynthesis?

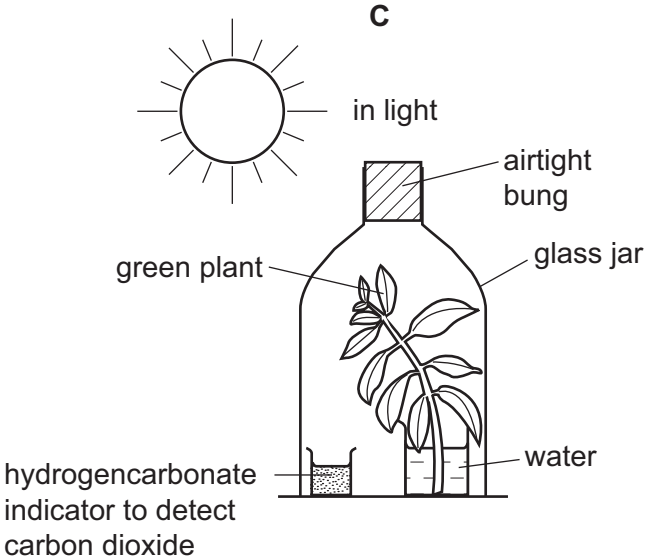
A



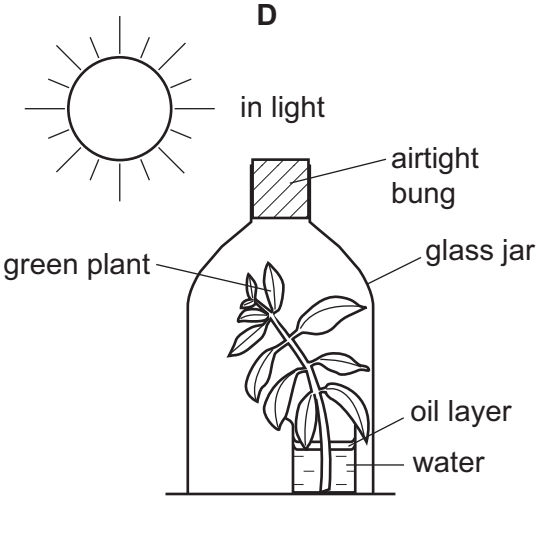
B



C

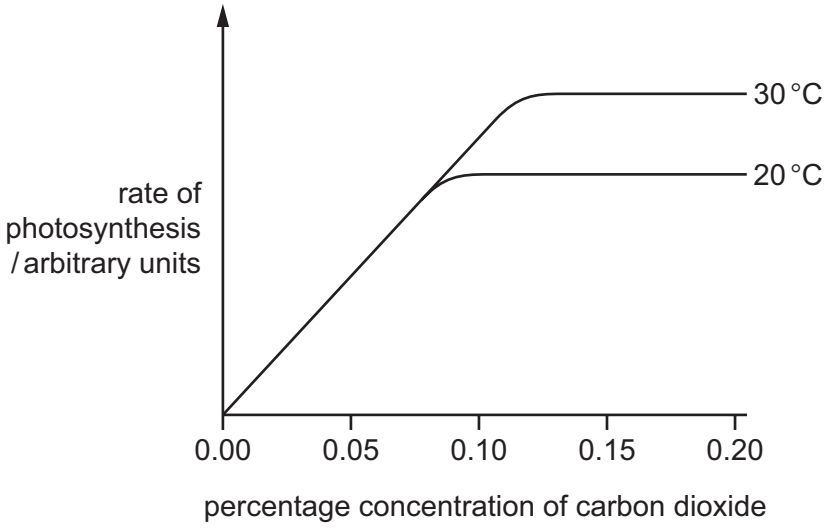


D



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7 The graph shows the rate of photosynthesis in a plant in full sunlight at two different temperatures and different concentrations of carbon dioxide.



At normal atmospheric carbon dioxide concentrations, what limits the rate of photosynthesis?

A carbon dioxide concentration

B light intensity

C temperature

D water availability

8 Which organ produces an acid which kills the bacteria in ingested food?

A liver

B pancreas

C salivary gland

D stomach

9 A patient has her gall bladder surgically removed.

How will this affect the functioning of her body?

A reducing the absorption of carbohydrates

B reducing the digestion of fats

C reducing the liver's ability to convert glucose to glycogen

D reducing the volume of stored urine

10 Four of the organs of the alimentary canal are listed.

J colon

K duodenum

L oesophagus

M stomach

Which sequence shows the order in which food passes through these organs?

A K → J → L → M

B L → K → M → J

C L → M → K → J

D M → L → J → K

11 Which feature of root hairs suggests that they take up ions from the soil by active transport?

A Their cell membranes are partially permeable.

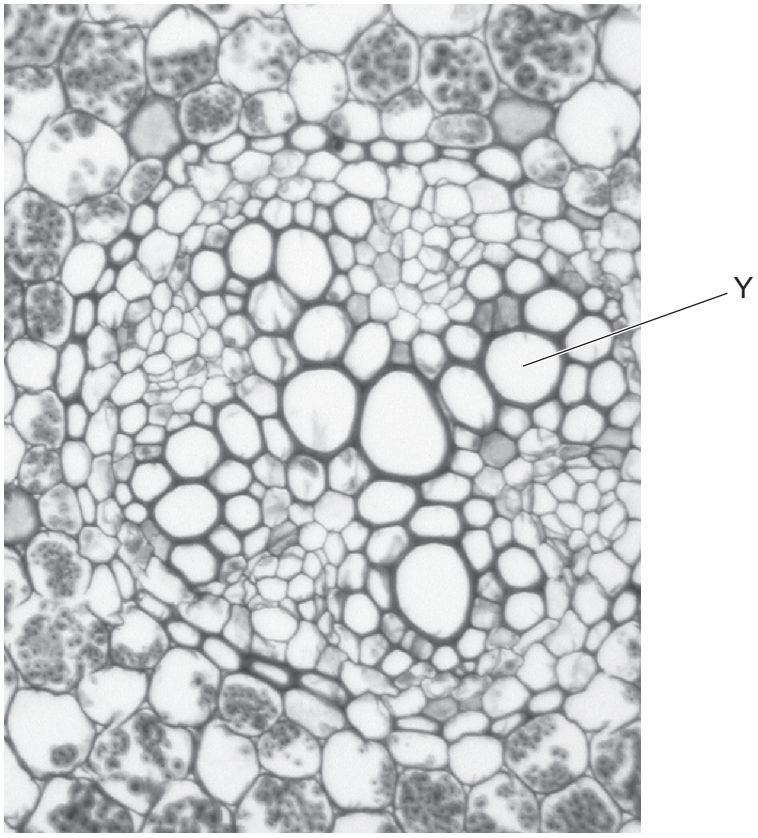
B They have a large surface area.

C They have a lower water potential than the soil.

D They take up ions more slowly in low oxygen concentrations.

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12 The photomicrograph shows part of a section through a root.



The contents of Y are tested with Benedict's solution and with iodine solution.

Which results are expected?

	Benedict's solution	iodine solution
A	+	+
B	+	–
C	–	+
D	–	–

key

+ = positive result

– = negative result

13 Which blood vessels carry blood to the liver?

	hepatic artery	hepatic portal vein	hepatic vein	vena cava
A	yes	yes	no	no
B	yes	no	yes	no
C	no	yes	no	yes
D	no	no	yes	yes

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[Turn over

14 Which blood vessels contain valves?

	capillary	renal artery	renal vein
A	✓	✗	✗
B	✗	✗	✓
C	✓	✓	✗
D	✗	✓	✓

key

✓ = contains valves

✗ = does not contain valves

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 Which word equation represents aerobic respiration?

A carbon dioxide + water → glucose + oxygen

B carbon dioxide + oxygen → glucose

C glucose + oxygen → carbon dioxide + water

D glucose + oxygen → water

17 What lines the walls of alveoli?

A a carpet of cilia

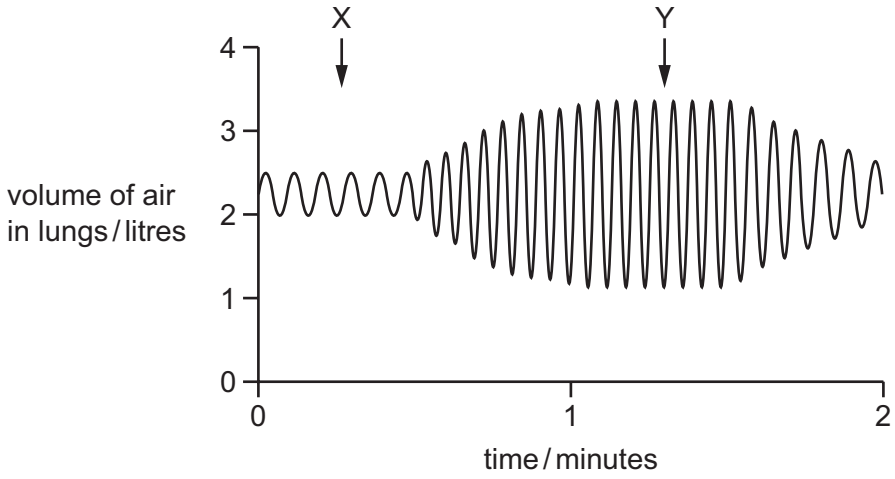
B a film of moisture

C a network of veins

D a thin sheet of muscle

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18 The graph 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 X and Y?

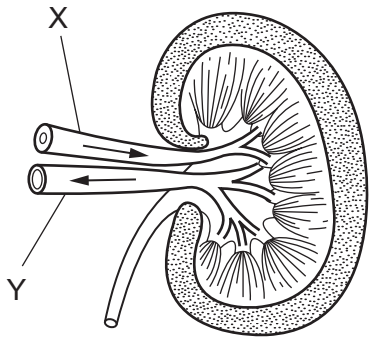
A changing from running to walking

B changing from walking to running

C decreased frequency of contractions of the internal intercostal muscles

D decreased strength of contractions of the internal intercostal muscles

19 The diagram shows a kidney and blood vessels associated with it.



Which statements are correct?

1 Vessel X contains more urea than vessel Y.

2 Vessel Y contains urine.

3 Vessel X contains more oxygen than vessel Y.

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

20 Which of these statements describes control by **negative** feedback?

A An injury to body tissue activates platelets in the blood and these activated platelets release chemicals which activate more platelets.

B During the menstrual cycle, luteinising hormone (LH) stimulates the release of oestrogen which in turn stimulates the release of more LH.

C A higher concentration of carbon dioxide in the atmosphere increases temperature, which increases photosynthesis producing more carbon dioxide.

D When blood pressure is high, nerve impulses from the brain cause the blood vessels to dilate and blood pressure is reduced.

21 Which statements describe the pupil reflex in bright light?

1 ciliary muscles contract

2 ciliary muscles relax

3 circular iris muscles contract

4 circular iris muscles relax

5 lens becomes rounder

6 lens becomes thinner

7 pupil constricts

8 pupil dilates

9 radial iris muscles contract

10 radial iris muscles relax

A 1, 6 and 9 **B** 2, 5 and 10 **C** 3, 7 and 10 **D** 4, 8 and 9

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

A bile

B enzyme

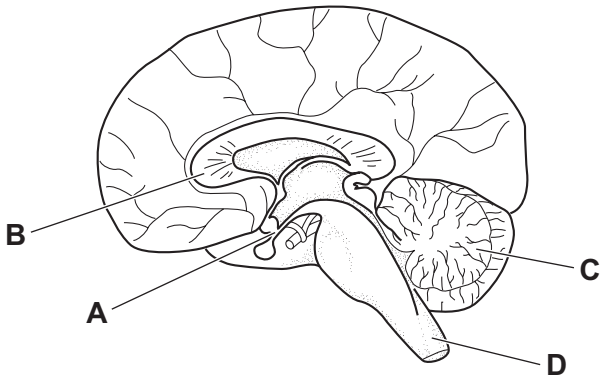
C hormone

D saliva

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23 The diagram shows a section through the human brain.

Which labelled part contains the temperature regulation centre?



24 Which statements about the elbow joint are correct?

1 When the biceps muscle contracts, the elbow is bent.

2 When the triceps muscle relaxes, the elbow is straightened.

3 Skeletal muscles work in antagonistic pairs.

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

25 What are the effects of heroin?

	can cause addiction	delays sleep and increases alertness	withdrawal symptoms are severe
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = yes

✗ = no

26 Which process, brought about by microorganisms, does **not** depend on anaerobic respiration?

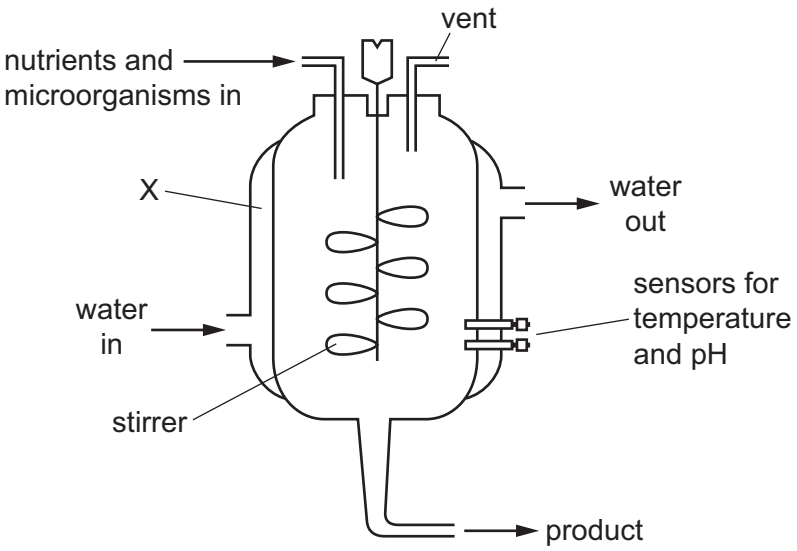
A the conversion of milk into yoghurt by bacteria

B the formation of lactic acid in cheese production by bacteria

C the release of alcohol by the action of yeasts on sugars

D the synthesis of single cell protein in fermenters

27 The diagram shows the equipment used in the industrial production of penicillin.



What is the purpose of the structure labelled X?

A to insulate the fermentation vessel

B to maintain the pressure of the fermentation vessel

C to monitor the temperature of the fermentation vessel

D to remove the heat produced by the fermentation process

28 The flow of energy in ecosystems is non-cyclical.

What is the main reason for this?

A Energy can be transferred back to its original source.

B Energy is not transferred from living things to their environment.

C Energy is only transferred from smaller to larger organisms.

D Energy is transferred from living organisms as heat.

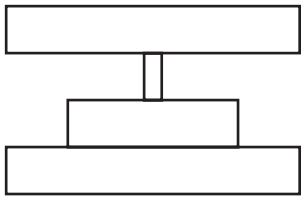
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29 The diagram shows a food chain.

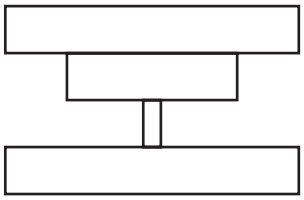
grasses → zebras → lions → fleas

Which pyramid of numbers would represent this food chain?

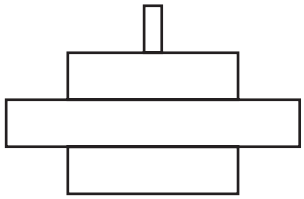
A



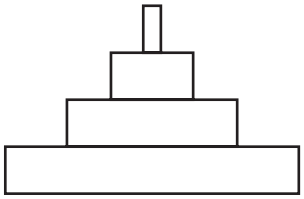
B



C

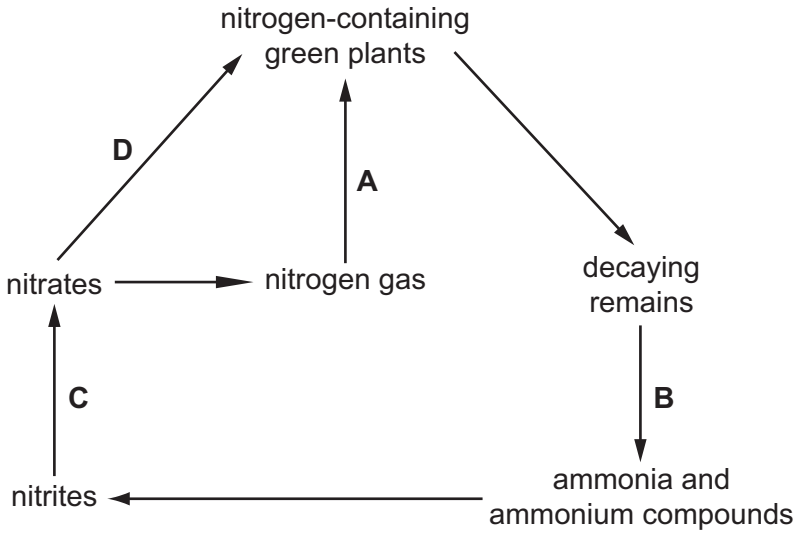


D



30 The diagram shows parts of the nitrogen cycle.

Which arrow represents the action of the root nodule bacteria of leguminous plants?



31 Which row matches a method of controlling malaria with the explanation of how this method works?

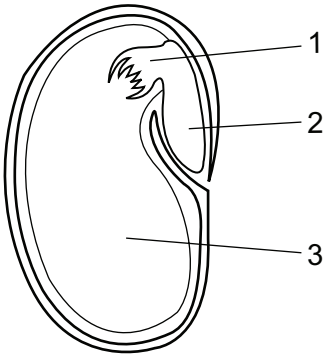
	method	explanation
A	covering windows with netting	kills mosquitoes
B	spraying oil on rivers	kills mosquito larvae
C	taking anti-malarial tablets	stops mosquitoes biting
D	using insecticides	kills malarial parasites

32 Areas of tropical rainforests are often cut down and cleared. After cutting down the trees, the areas are normally burnt.

What are the effects of this activity?

	atmospheric carbon dioxide	number and variety of species	soil stability
A	decreases	decreases	increases
B	decreases	increases	decreases
C	increases	decreases	decreases
D	increases	decreases	increases

33 The diagram shows a section of a seed.



What are the numbered parts?

	1	2	3
A	cotyledon	plumule	radicle
B	plumule	cotyledon	radicle
C	plumule	radicle	cotyledon
D	radicle	plumule	cotyledon

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34 Which processes involve parts of the carpel of a flower?

A attracting insects and pollination

B fertilisation and producing pollen

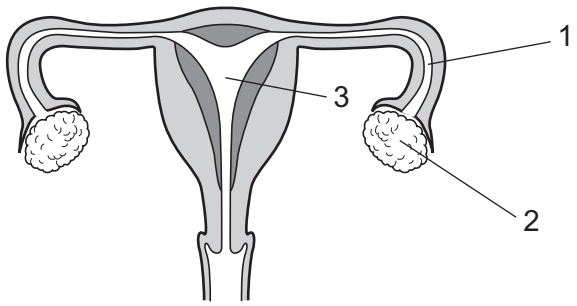
C forming fruit and pollination

D releasing pollen and fertilisation

35 What identifies a cause, a symptom and a treatment for syphilis in humans?

	cause	symptom	treatment
A	virus	infertility	using antibiotics
B	bacterium	burning sensation when urinating	vaccination
C	bacterium	joints becoming painful	using antibiotics
D	virus	severe headaches	vaccination

36 The diagram shows the female reproductive system.



In which parts are the eggs and the zygote formed?

	eggs	zygote
A	1	2
B	1	3
C	2	1
D	2	3

37 Natural selection plays a role in evolution.

What describes features of natural selection that can affect evolution?

	better adapted individuals have a greater chance of surviving and breeding	survivors may transfer an advantageous feature to their offspring
A	no	no
B	no	yes
C	yes	no
D	yes	yes

38 In guinea-pigs, the allele for black fur (B) is dominant to the allele for brown fur (b). A breeder can sell a brown guinea-pig for more money than a black guinea-pig.

Which cross will produce the most money?

A BB × BB **B** BB × Bb **C** Bb × Bb **D** Bb × bb

39 The inheritance of the ABO blood groups in humans is controlled by three alleles (I^A, I^B and I^O), only two of which can be present in one individual.

What are the possible blood groups of children born to a homozygous group A woman and a heterozygous group B man?

A AB and B only

B AB and A only

C A, B and AB only

D A, B, AB and O

40 Which statement is **always** true of dominant alleles?

A They cannot undergo mutation.

B They give a greater chance of survival than recessive alleles.

C They give the same phenotype in heterozygotes and homozygotes.

D They occur less frequently in the population than recessive alleles.

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