Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/12**

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.

This document has **20** pages. Blank pages are indicated.

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1 Starting with the smallest, and ending with the largest, what is the correct sequence of these parts of an organism?

A chromosome → gene → nucleus → cell → tissue

B chromosome → gene → nucleus → tissue → cell

C gene → chromosome → nucleus → cell → tissue

D gene → chromosome → nucleus → tissue → cell

2 Which movement of a substance in plants is an energy-consuming process?

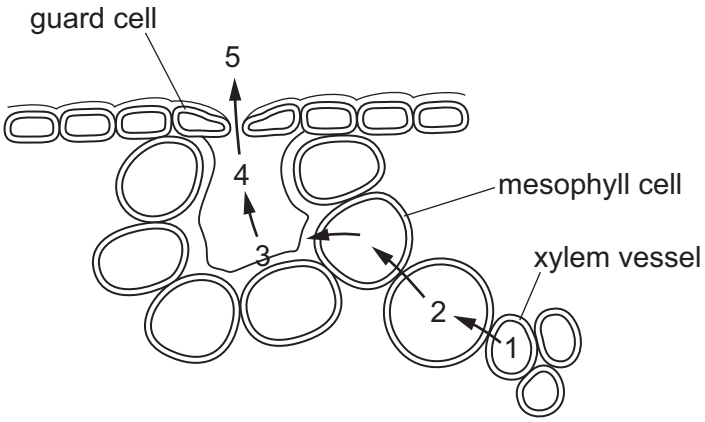
A absorption of carbon dioxide by a palisade cell

B absorption of oxygen by a mesophyll cell

C nitrate uptake by root hair cells

D transport of water up through the xylem

3 The diagram shows the movement of water through part of a leaf.



Which processes are involved in the movement of water at these stages?

	1–2	3–4	4–5
A	diffusion	evaporation	osmosis
B	evaporation	diffusion	osmosis
C	osmosis	diffusion	evaporation
D	osmosis	evaporation	diffusion

4 Which substance is an enzyme?

A chlorophyll

B fibrinogen

C insulin

D lipase

5 What is the effect on plants of a lack of magnesium ions?

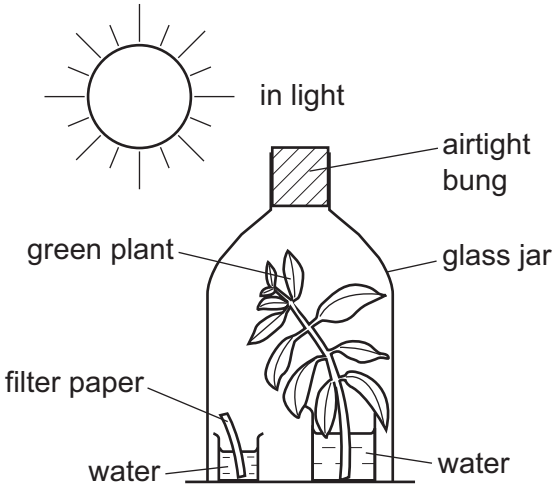
A Chlorophyll production is reduced.

B Leaves turn dark green.

C Starch production increases.

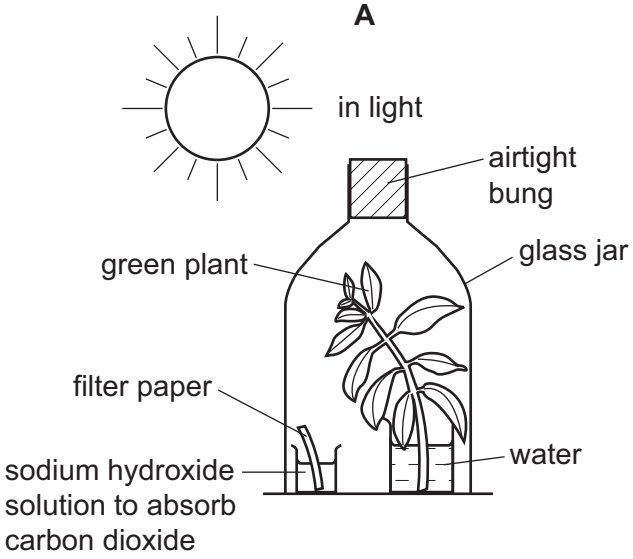
D Young leaves wilt.

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



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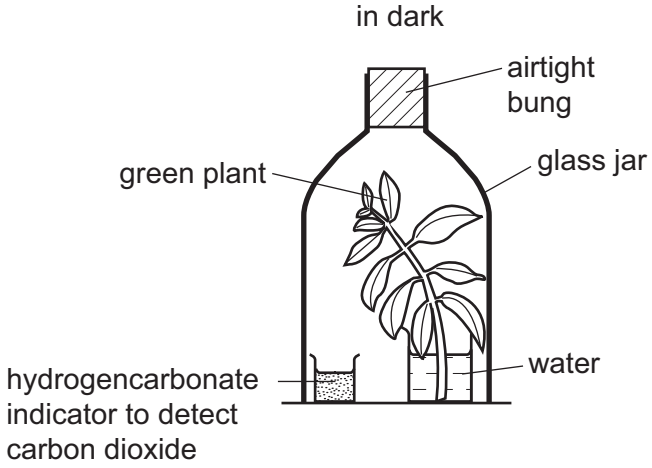

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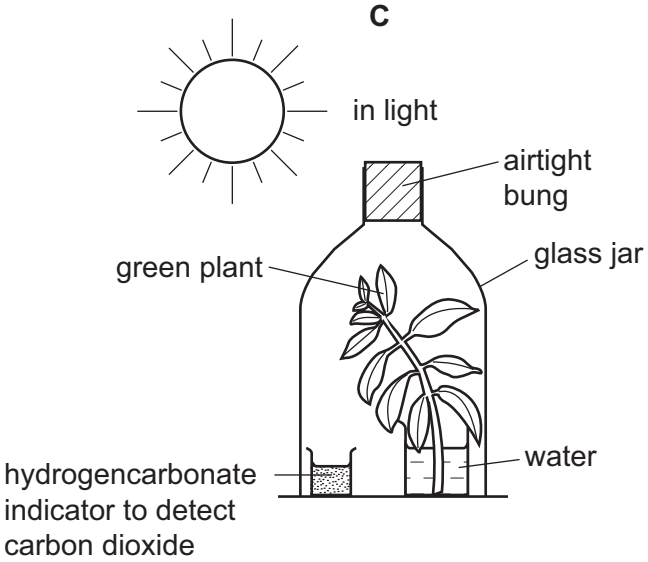
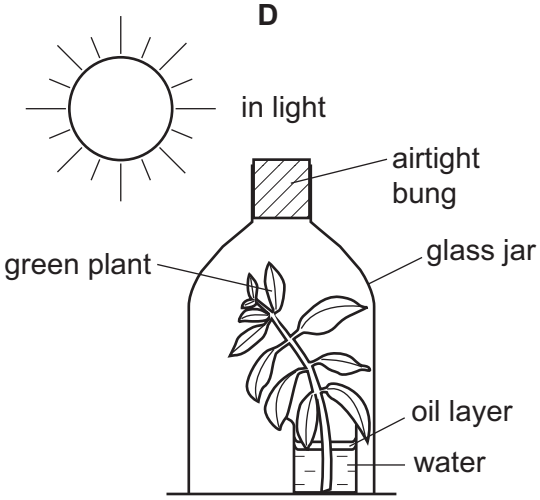
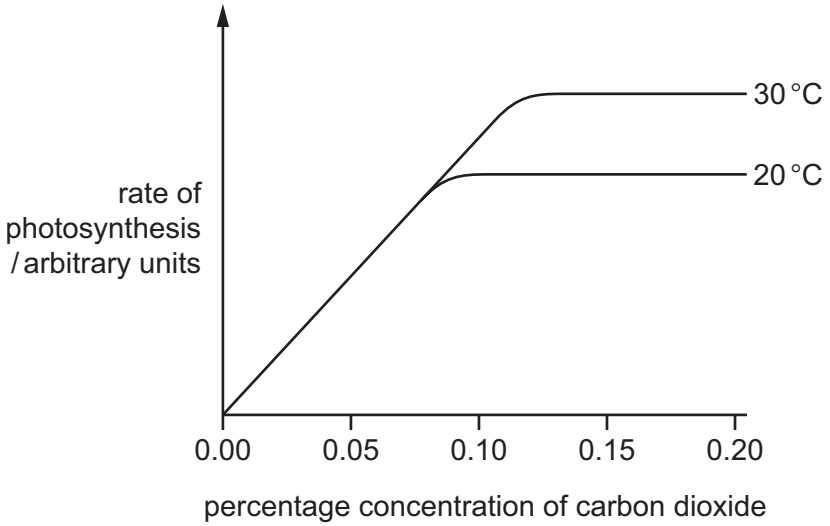


D



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 process happens in the duodenum?

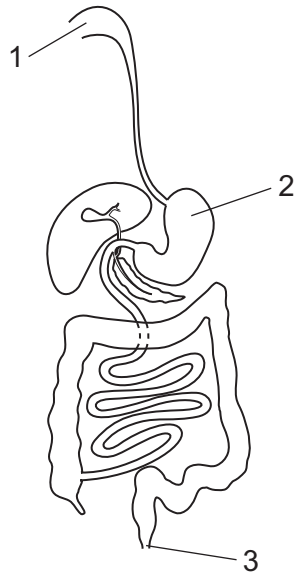
A bile is formed

B faeces are formed

C fats are digested by lipase

D pancreatic juice lowers the pH

9 The diagram shows the human alimentary canal.

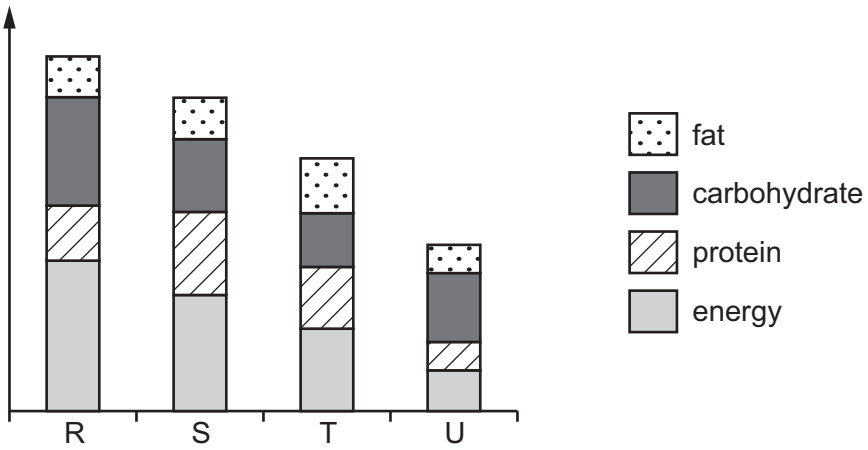


Where do egestion and ingestion occur?

	egestion	ingestion
A	1	3
B	2	3
C	3	1
D	3	2

10 The bar chart shows the recommended daily food intake of four people:

- an 80 year-old retired man
- a male manual worker
- a 6 year-old child
- a breast-feeding mother.



Which row correctly identifies two of these four people?

A child is U; retired man is R

B manual worker is T; child is S

C mother is S; manual worker is R

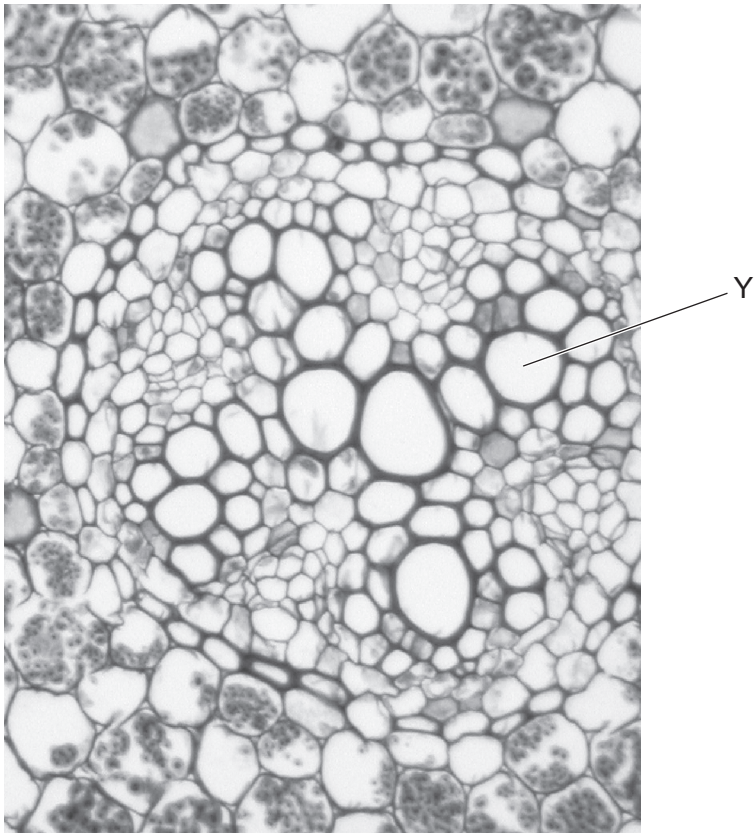
D retired man is R; mother is U

11 Water and ions can reach the xylem of a plant root through cell walls, without passing through a cell membrane.

How do these substances move through the cell walls?

	water	ions
A	diffusion	diffusion
B	diffusion	osmosis
C	osmosis	diffusion
D	osmosis	osmosis

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?

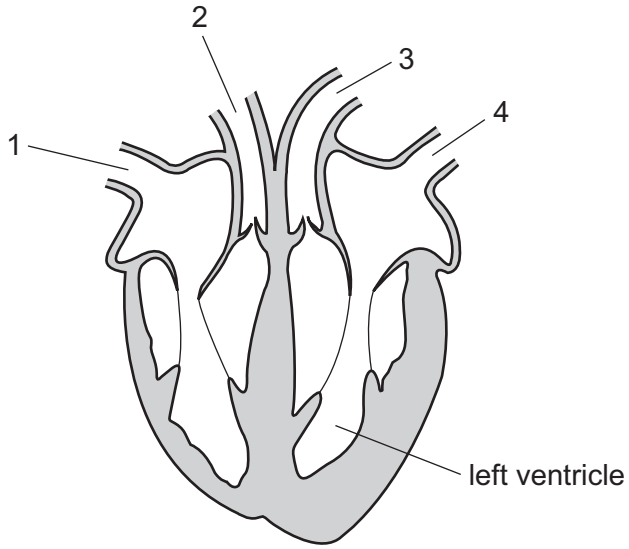
	Benedict's solution	iodine solution
A	+	+
B	+	–
C	–	+
D	–	–

key

+ = positive result

– = negative result

13 The diagram shows a section through the heart.



Which two numbered parts contain oxygenated blood?

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

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 During which activity is anaerobic respiration most likely to occur?

A breathing

B sleeping

C sprinting 100 metres

D walking to school

17 Which structure is lined with cilia?

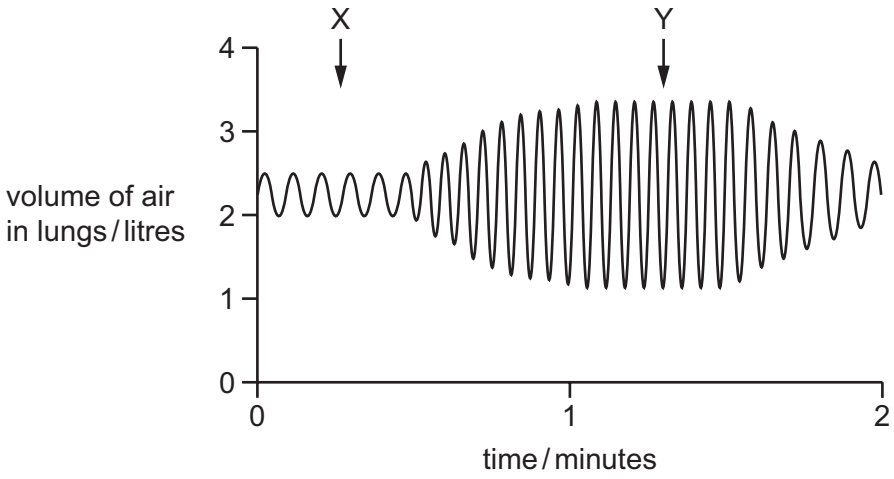
A alveolus

B bronchus

C oesophagus

D small intestine

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?

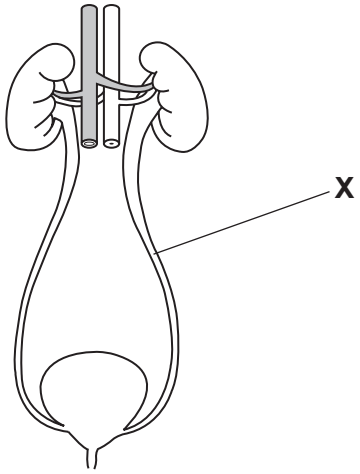
A changing from running to walking

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 the human kidneys and their associated structures.



What is the structure labelled **X**?

A renal artery

B renal vein

C ureter

D urethra

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 structures does light pass through when it is focused on the retina?

	cornea	lens	sclera
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = yes

✗ = no

22 Where are receptors found?

A along the length of all neurones

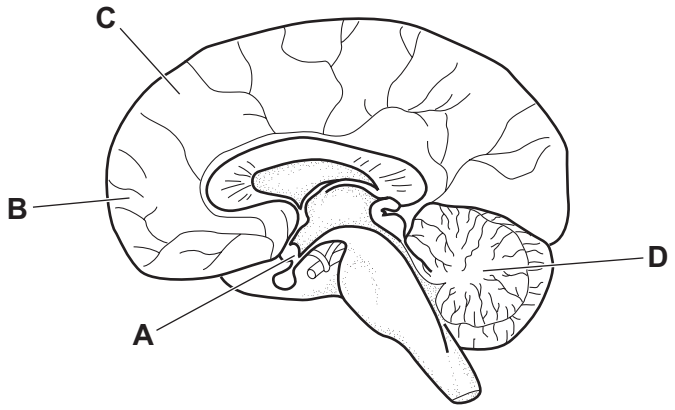
B at both ends of relay neurones

C at one end of motor neurones

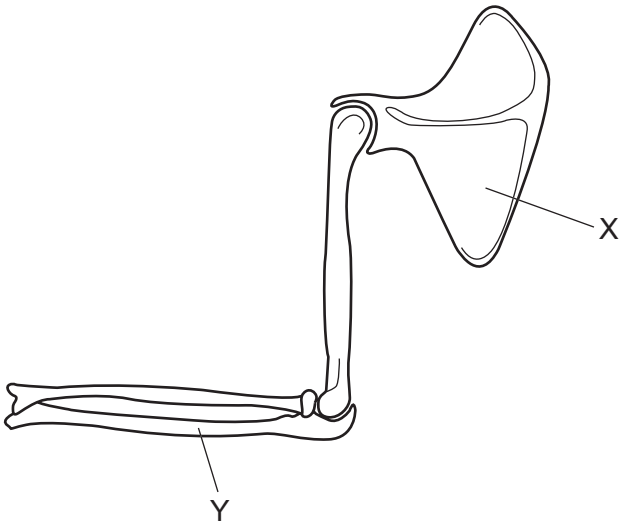
D at one end of sensory neurones

23 The diagram shows a section through the human brain.

Which part senses and reacts to a change in blood temperature?



24 The diagram shows the bones of the human forearm.



What are the bones X and Y?

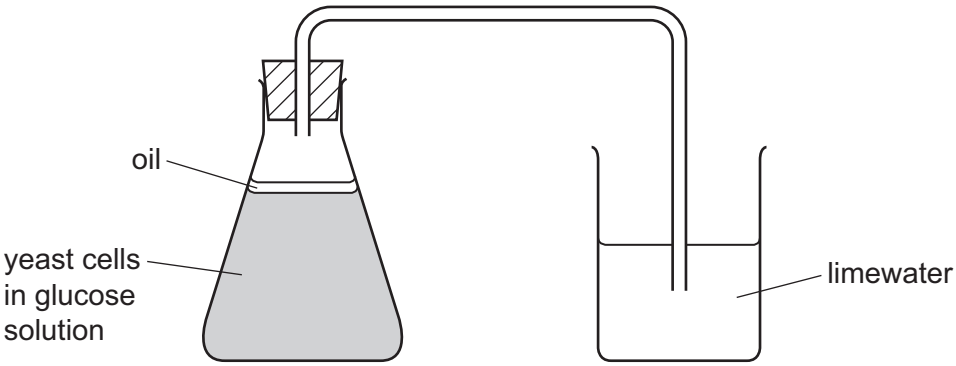
	X	Y
A	humerus	radius
B	humerus	ulna
C	scapula	radius
D	scapula	ulna

25 When a mother smokes during pregnancy, the oxygen supply to the fetus is reduced.

Which row shows how components of tobacco smoke cause this?

	combines with haemoglobin	constricts blood vessels in umbilical cord
A	carbon monoxide	nicotine
B	carbon monoxide	tar
C	tar	carbon monoxide
D	tar	nicotine

26 The diagram shows some apparatus set up to produce alcohol by fermentation.



What is the purpose of the oil layer?

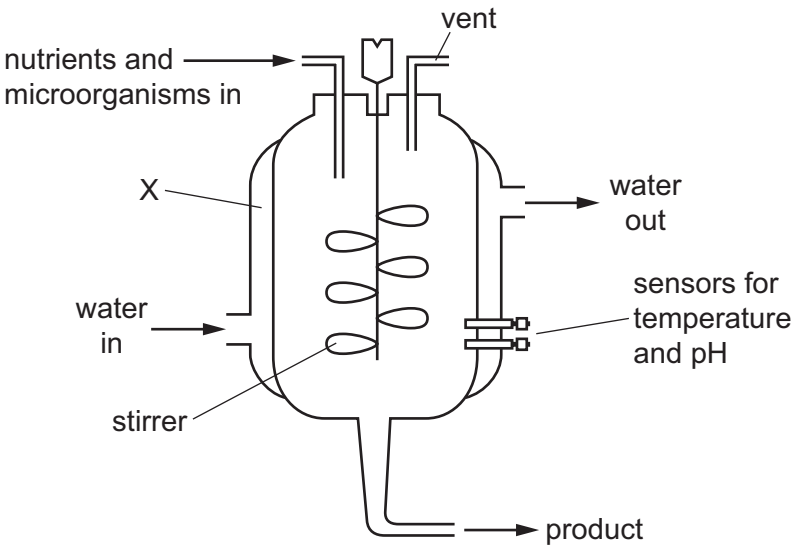
A to keep the alcohol in the solution

B to prevent aerobic respiration

C to produce carbon dioxide

D to provide nutrients for the yeast

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 diagram shows a food chain.

aquatic plant → tadpole → small fish → bird

Which group of organisms is missing from this food chain?

A carnivores

B decomposers

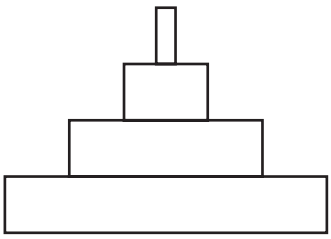
C herbivores

D producers

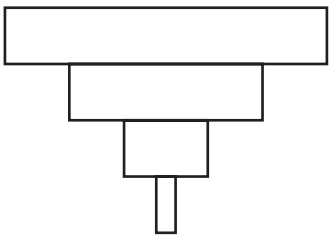
29 Insects feed on a tree's leaves. The insects are eaten by small birds that are the prey of larger birds.

Which pyramid of numbers illustrates this food chain?

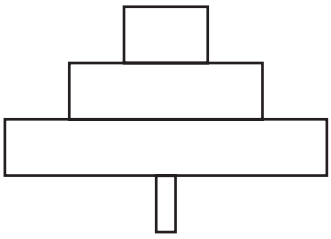
A



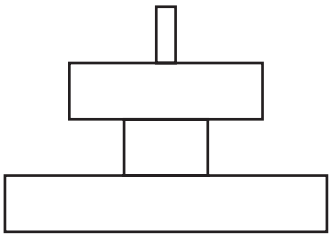
B



C

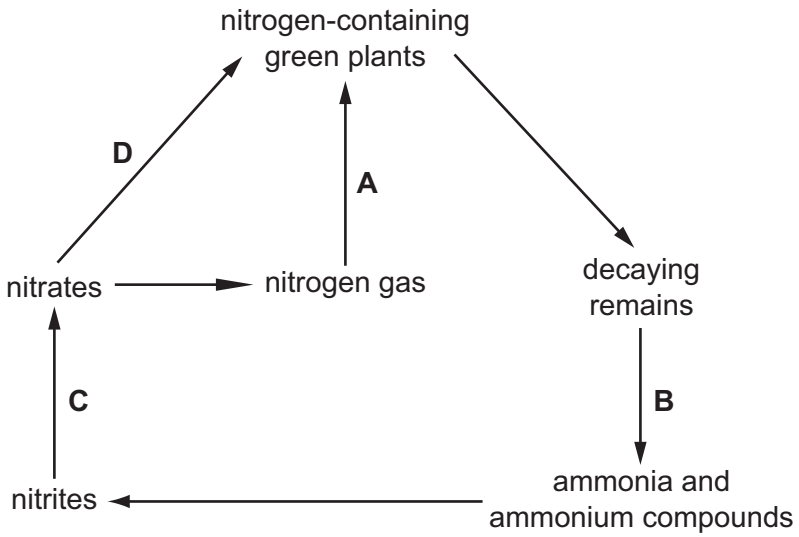


D



30 The diagram shows parts of the nitrogen cycle.

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



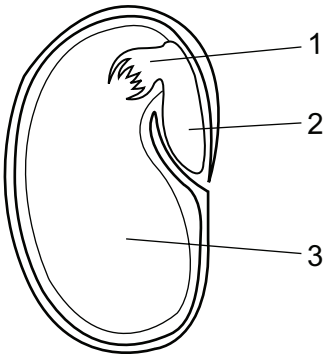
31 Which row shows the malarial parasite and the vector involved in its transmission?

	parasite	vector
A	female mosquito	human
B	human	male mosquito
C	malarial pathogen	female mosquito
D	male mosquito	malarial pathogen

32 Which pollutants may be released by agricultural practices?

	pollutant			
	insecticides	methane	fertiliser	sulfur dioxide
A	yes	yes	yes	no
B	yes	yes	no	yes
C	yes	no	yes	yes
D	no	yes	yes	yes

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

34 Which statements about meiosis are correct?

	meiosis produces genetically identical nuclei	meiosis produces haploid nuclei
A	✗	✗
B	✗	✓
C	✓	✗
D	✓	✓

key
✓ = correct
✗ = not correct

35 The spread of HIV has been reduced in many countries.

Which action has assisted this reduction?

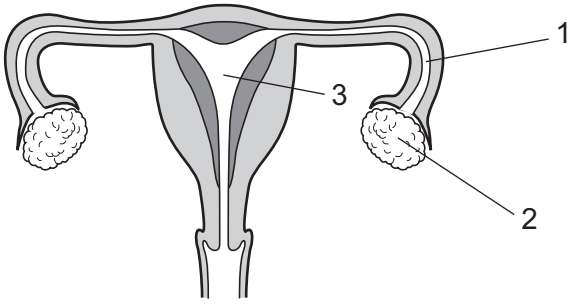
A development of an effective vaccine

B health education

C treating patients with new antibiotics

D using drugs that slow the appearance of symptoms of HIV

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 What describes features of natural selection?

	causes mutations to happen	leads to the evolution of new species	results in existing species becoming extinct
A	yes	yes	yes
B	yes	yes	no
C	yes	no	yes
D	no	yes	yes

38 A farmer uses sperm from a black male sheep to artificially inseminate (fertilise) 20 light brown female sheep.

All of the offspring produced were black.

Which statement explains these results?

A The alleles for light brown colour are dominant.

B The male sheep is heterozygous and the allele for black colour is dominant.

C The male sheep is homozygous and the allele for black colour is codominant.

D The male sheep is homozygous and the allele for black colour is dominant.

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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