Cambridge Assessment International Education

Cambridge O Level

BIOLOGY **5090/11**

Paper 1 Multiple Choice **October/November 2021**

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

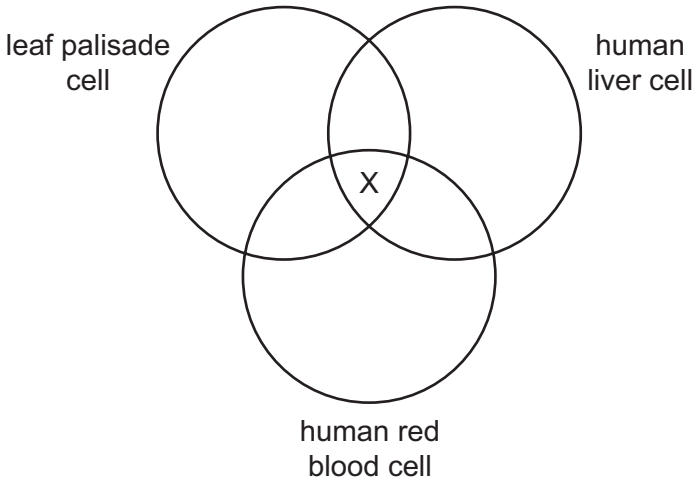
- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the 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.
- Any rough working should be done on this question paper.

IB21 11_5090_11/4RP
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1 The diagram represents the cell structures of a human liver cell, a leaf palisade cell and a human red blood cell.



Which cell structure is X?

A cell wall

B chloroplast

C cytoplasm

D nucleus

2 Which process occurs by diffusion alone?

A movement of carbon dioxide into the palisade cells in a leaf

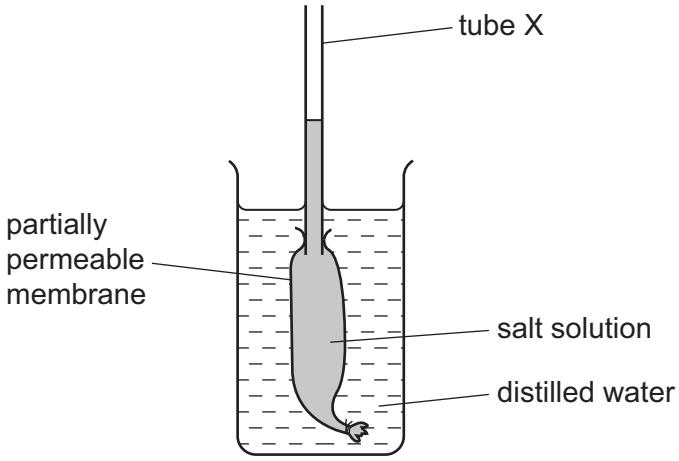
B uptake of magnesium ions by root hair cells

C movement of food from the stomach to the duodenum

D transfer of glucose molecules from the ileum into the blood

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3 An experiment to investigate osmosis is set up as shown.



What happens to the height of the liquid in tube X and the concentration of the salt solution?

	height of the liquid in tube X	concentration of the salt solution
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

4 The diagrams show an enzyme molecule and some substrate molecules.



enzyme molecule

Which diagram shows the substrate molecule for this enzyme?

A



B



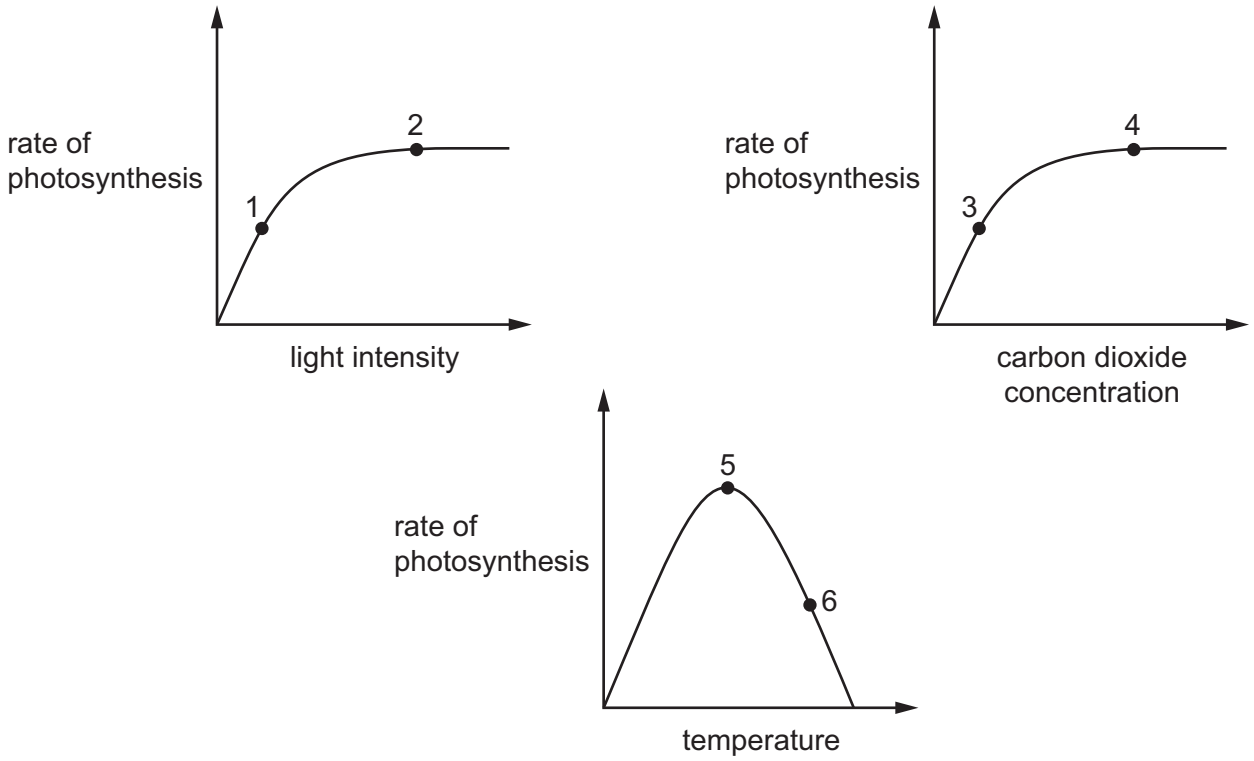
C



D



5 The graphs show factors affecting the rate of photosynthesis.

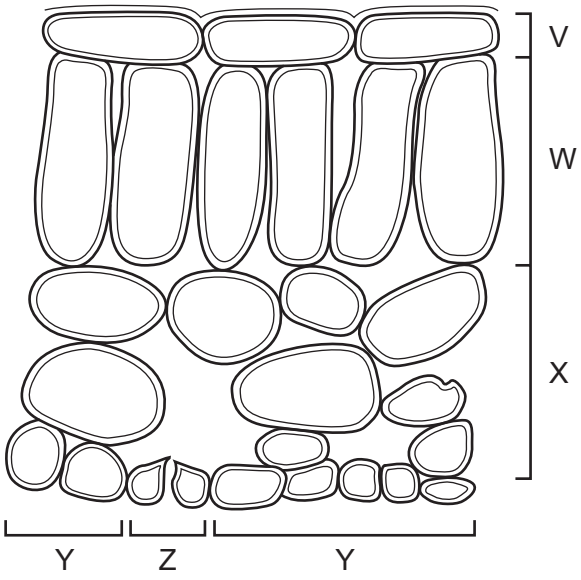


At which points on the graphs could the rate of photosynthesis be limited by light intensity?

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

6 The diagram shows the arrangement of cells inside a green leaf. Different types of cells are indicated by the brackets.

No cell contents are shown.



Which types of cells contain chloroplasts?

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

7 Why do newly germinated seeds fail to grow into healthy plants if they lack magnesium ions?

A Magnesium ions are a necessary component of all proteins.

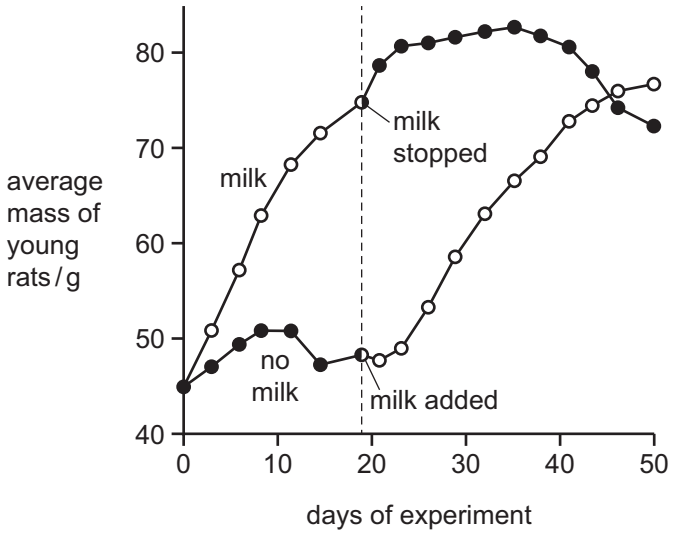
B Magnesium ions are needed to convert chlorophyll to starch.

C Magnesium ions are needed to form cell walls.

D Magnesium ions are needed to form chlorophyll molecules.

8 Milk contains water, carbohydrates, proteins, fats, and some minerals and vitamins.

The graph shows the results of an experiment. One group of young rats was given 3 cm^3 of milk per day for 18 days. On day 18, the milk was stopped for this group but given to a second group of young rats. All other factors were kept constant for the two groups of rats.



What is the explanation for these results?

A Whether or not young rats are given milk, their mass is always the same on day 46.

B Milk contains the nutrients needed for young rats to grow.

C Milk is not important for the growth of young rats.

D Young rats grow fastest after day 18.

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

A Digestion of carbohydrates is completed in the colon.

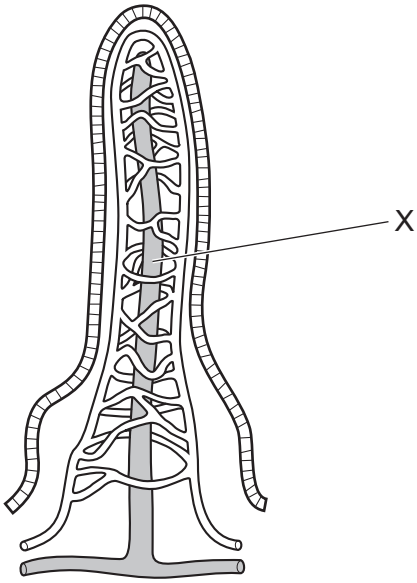
B Enzymes are secreted to break down cellulose in the duodenum.

C Protein digestion is completed in the ileum.

D The stomach secretes enzymes to break down starch.

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10 The diagram shows a section through a villus.



Which products of digestion are mainly absorbed by vessel X?

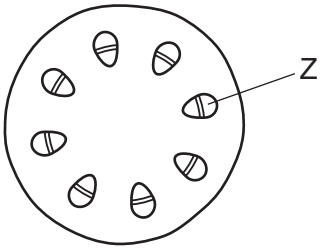
A amino acids and glucose

B glucose and fatty acids

C fatty acids and glycerol

D glycerol and amino acids

11 The diagram shows a section through a plant stem.



Which process is responsible for moving substances in region Z?

A diffusion

B osmosis

C translocation

D transpiration

12 Which statement describes why a leaf wilts?

A Less water is absorbed by the root hairs when the stomata are closed.

B Less water is absorbed by the root hairs than is lost through the stomata.

C More water is absorbed by the root hairs when the stomata are closed.

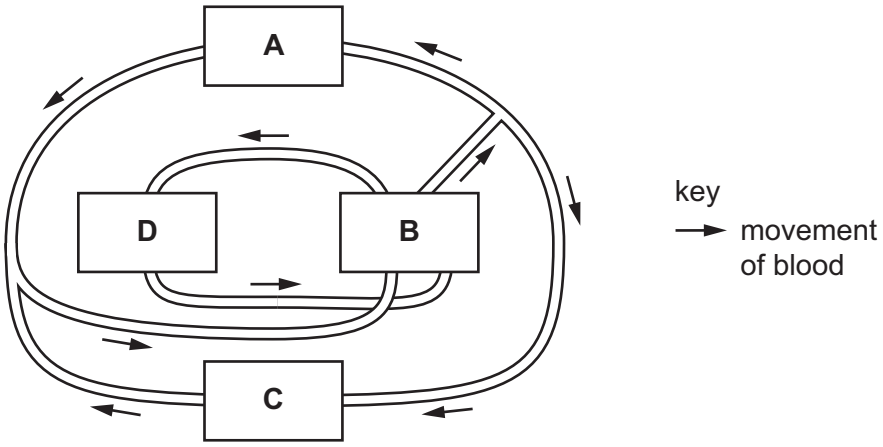
D More water is absorbed by the root hairs than is lost through the stomata.

13 How do veins differ from arteries?

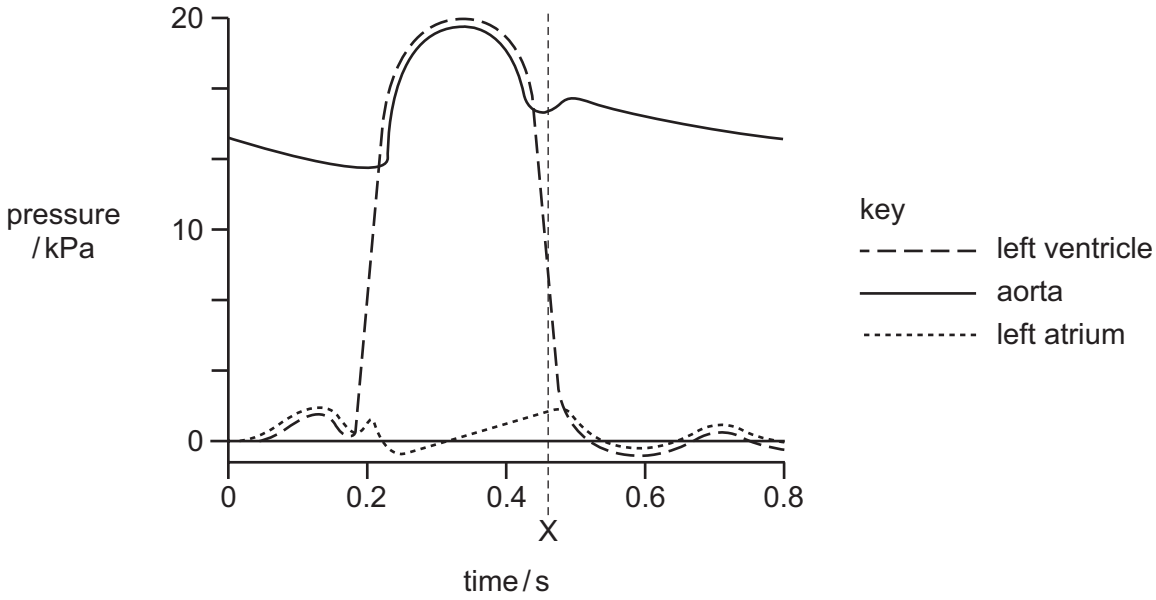
	width of lumen in veins	wall thickness of veins	elastic fibres	muscles in wall
A	narrower	thicker	more	fewer
B	narrower	thinner	fewer	more
C	wider	thicker	more	more
D	wider	thinner	fewer	fewer

14 The diagram shows a simplified human circulatory system.

Which structure represents the heart?



15 The diagram shows the pressures in the left side of the heart during one heartbeat.



Which valves are open and which are closed at the time marked X?

	bicuspid	semi-lunar
A	closed	closed
B	closed	open
C	open	closed
D	open	open

16 Energy is needed for many processes within the body.

Which process does **not** require the use of energy?

A contraction of muscles in the intestines

B movement of oxygen from the alveoli into the blood

C generation of nerve impulses

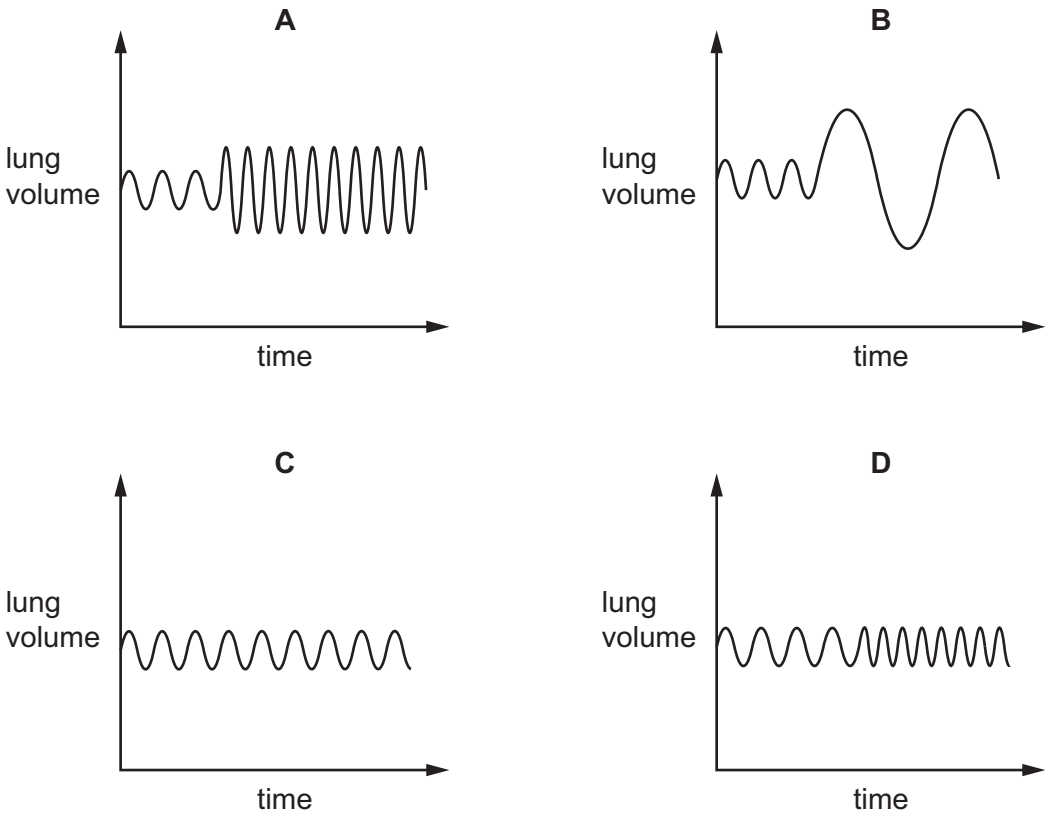
D protein synthesis in cells

17 What are features of the alveoli?

	lined by cilia	lined with moisture	walls are one cell thick
A	✓	✗	✓
B	✗	✓	✗
C	✓	✗	✗
D	✗	✓	✓

key
✓ = yes
✗ = no

18 Which graph shows a person's breathing when at rest and then exercising?



19 During kidney dialysis, which blood components pass from the blood into the dialysis fluid?

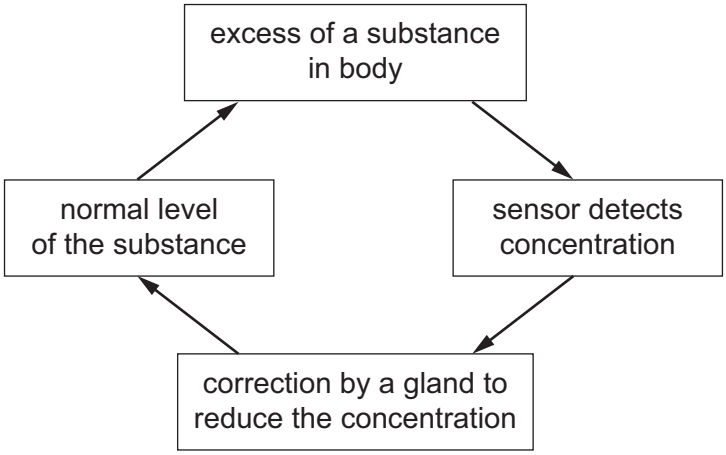
A platelets and proteins

B proteins and salts

C salts and urea

D urea and platelets

20 Which biological process is represented in the diagram?



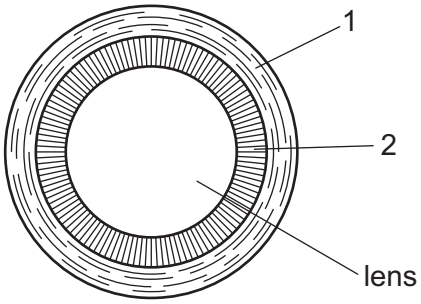
A antagonistic action

B dialysis

C negative feedback

D reflex action

21 The diagram shows a front view of the parts of the eye involved in producing a focused image of near and distant objects.

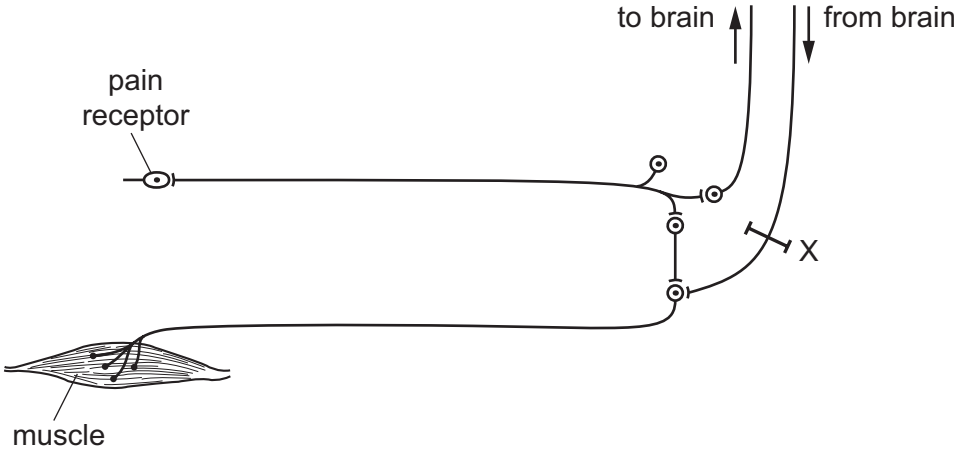


What are structures 1 and 2?

	structure 1	structure 2
A	ciliary muscles	suspensory ligaments
B	iris	pupil
C	pupil	iris
D	suspensory ligaments	ciliary muscles

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22 The diagram shows some of the nerve pathways associated with a reflex action.



If the pathway at X is damaged, how does this affect the reflex?

A The person will not be aware that the reflex is occurring.

B The reflex cannot be controlled consciously.

C The response will occur without any stimulus.

D There is no response to the stimulus.

23 Which statements about hormones are correct?

1 Insulin is made in the pancreas and increases the concentration of glucose in the blood.

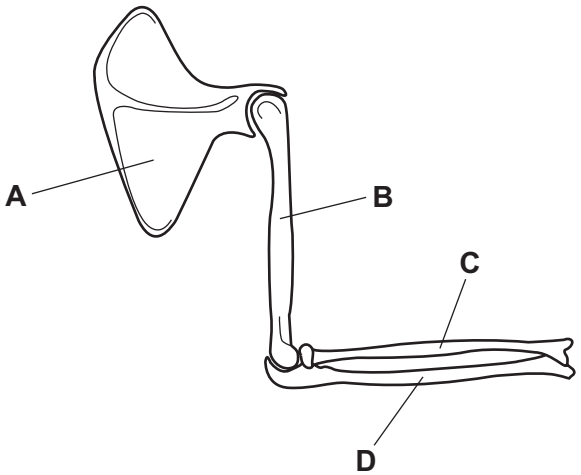
2 Adrenaline lowers the amount of glucose in the blood after a meal.

3 Insulin is used to treat people with diabetes mellitus.

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

24 The diagram shows the bones of the arm.

Which label represents the radius?



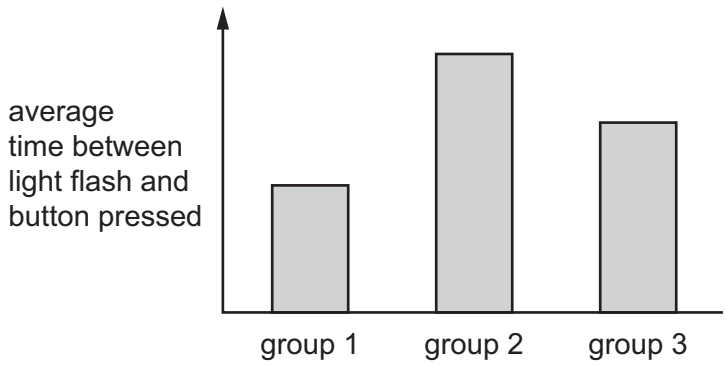
25 An investigation into reaction times involved three similar large groups of adults. Each adult had to press a button as soon as they saw a light flash. The time between the light coming on and the button being pressed was measured.

Group 1 did the task 30 minutes after smoking a cigarette.

Group 2 did the task 30 minutes after drinking 2 units of alcohol.

Group 3 was the control group. The control group did not smoke or drink alcohol.

The graph shows the results of this investigation.



What is the best conclusion from the data?

A Nicotine is a depressant and alcohol is a stimulant.

B Nicotine reduces reaction times and alcohol increases reaction times.

C Nicotine makes reactions slower and alcohol makes reactions faster.

D Nicotine and alcohol are both addictive.

26 What is a feature of all bacteria?

A They are parasites.

B They have a nucleus.

C They are made of hyphae.

D They are single-celled organisms.

27 Yeast is used in alcohol production.

What is the other product of this process?

A carbon dioxide

B oxygen

C glucose

D water

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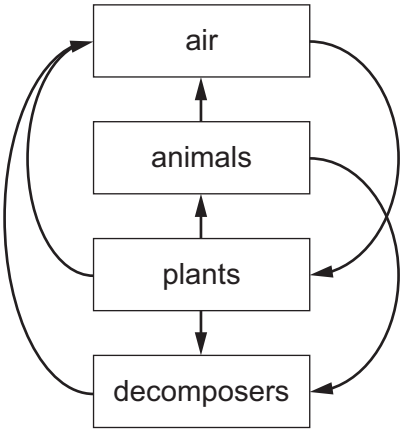
28 In a pyramid of biomass, the mass of producers is 800 g / m^2.

What are the likely masses of the carnivores and the herbivores?

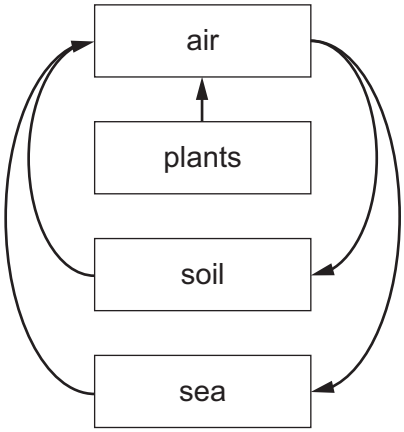
	carnivores g / m^2	herbivores g / m^2
A	4	40
B	40	4
C	40	40
D	400	40

29 Which diagram represents the flow of carbon atoms in an ecosystem?

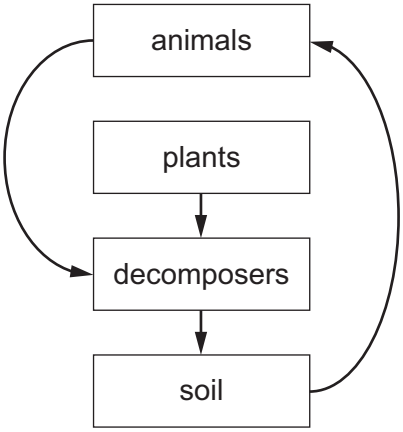
A



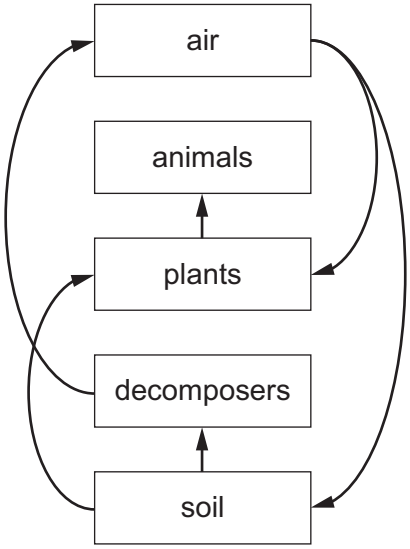
B



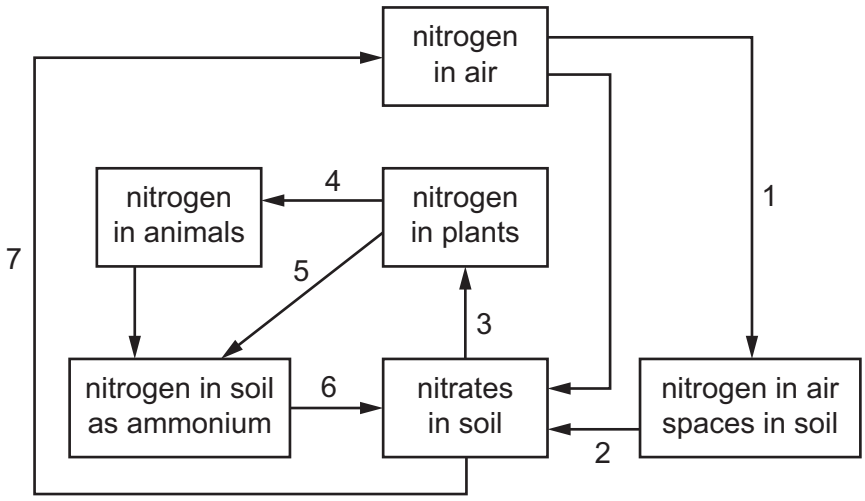
C



D



30 The diagram shows the nitrogen cycle.



Which stages involve bacteria?

A 1, 2, 5 and 6

B 2, 5, 6 and 7

C 3, 5, 6 and 7

D 3, 4, 5 and 6

31 Draining stagnant water is one method of controlling the malarial mosquito.

Which stages in the mosquito life cycle does this method affect?

A egg, larva, adult

B egg, larva, pupa

C egg, pupa, adult

D larva, pupa, adult

32 Which gas contributes to acid rain?

A methane

B nitrogen

C oxygen

D sulfur dioxide

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33 Which statement is correct about the offspring produced by asexual reproduction?

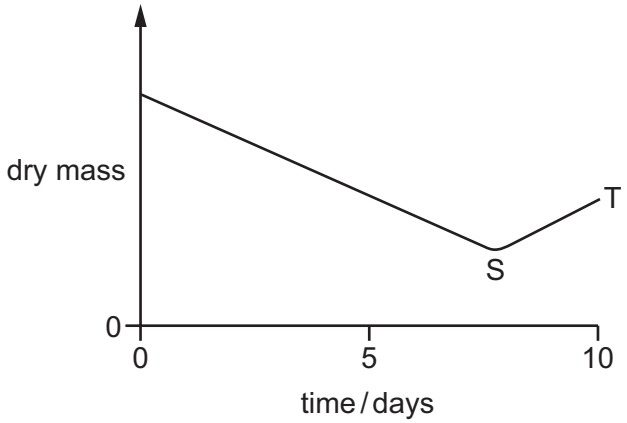
A They are genetically identical to both their parents.

B They are only produced by female parent plants.

C They are produced by the formation of a zygote.

D They have identical chromosomes to their parent.

34 The graph shows changes in the dry mass of a seed as it germinates and grows.



What causes the change shown between points S and T?

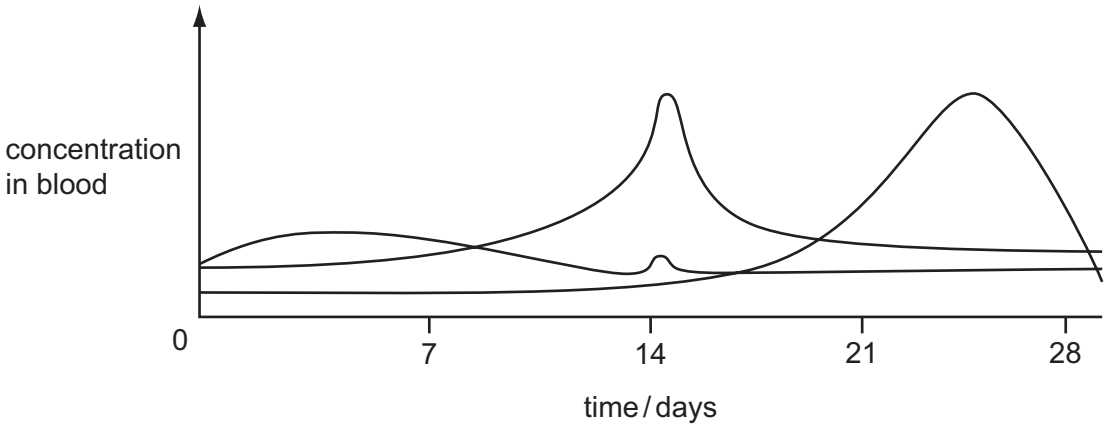
A osmosis

B photosynthesis

C respiration

D transpiration

35 The graph shows the concentration in the blood of three of the four hormones FSH, LH, oestrogen and progesterone during a menstrual cycle.



Which hormone is **not** shown?

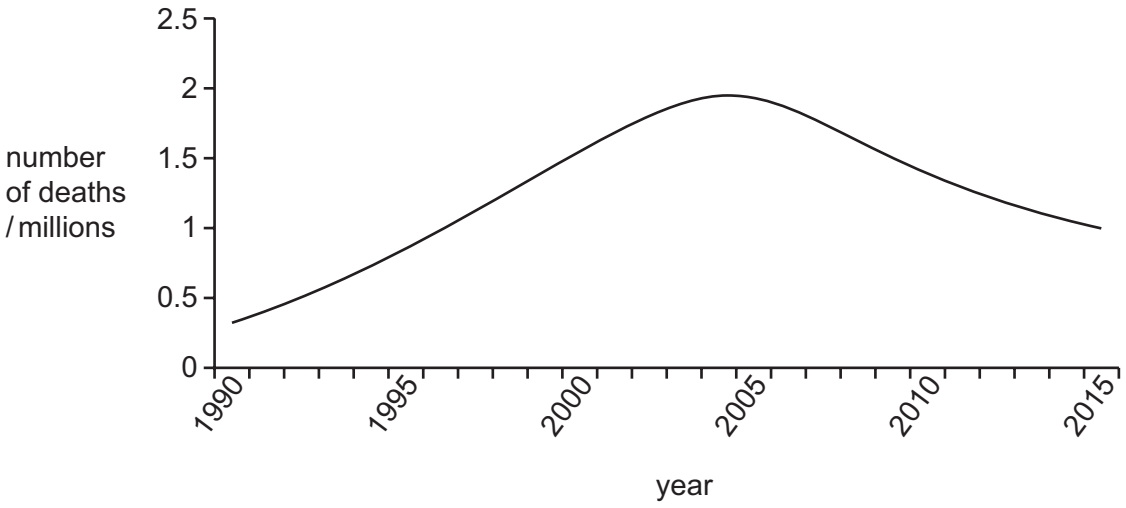
A FSH

B LH

C oestrogen

D progesterone

36 Infection with HIV can result in death from AIDS. The graph shows AIDS-related deaths from 1990 to 2015 in a country.



What is the best explanation for the trend in the number of AIDS-related deaths after 2005?

A More HIV-infected individuals were using natural methods of birth control.

B More HIV-infected men were using spermicides for birth control.

C More HIV-infected mothers were breastfeeding their babies.

D There was better education about HIV infection.

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37 Some statements about chromosomes are listed.

1 A chromosome includes a long molecule of DNA.

2 Genes are found in chromosomes.

3 In cell division, the chromosome number is kept the same by meiosis.

4 The normal human chromosome number is 46.

Which statements are correct?

A 1, 2, 3 and 4

B 1, 2 and 4 only

C 2 and 3 only

D 3 and 4 only

38 One gene has two codominant alleles, A^E and A^F, and one recessive allele, A^G.

How many different genotypes and phenotypes are possible?

	genotypes	phenotypes
A	3	3
B	4	6
C	6	4
D	6	6

39 What is a result of natural selection?

A dogs that are friendly to humans

B grapes that contain no seeds

C mosquitoes that are resistant to insecticides

D onion crops that have a pleasant taste

40 What is an advantage of genetic engineering?

A genes spreading to nearby organisms

B reduced use of insecticides

C reduction in biodiversity

D unexpected side effects in organisms

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