



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (PHYSICS, BIOLOGY)

5125/01

Paper 1 Multiple Choice

October/November 2007

1 hour

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



READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, highlighters, 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.

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.

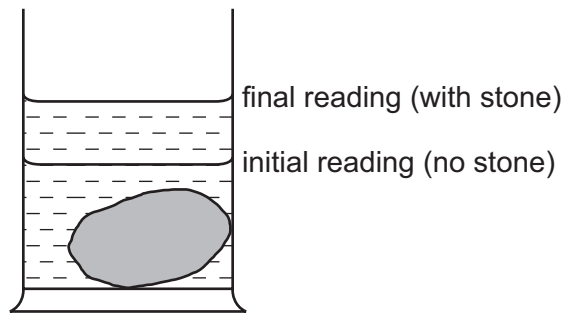
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

This document consists of **16** printed pages.



- 1 As part of an experiment to find the density of stone, a stone is lowered into a measuring cylinder partly filled with water.



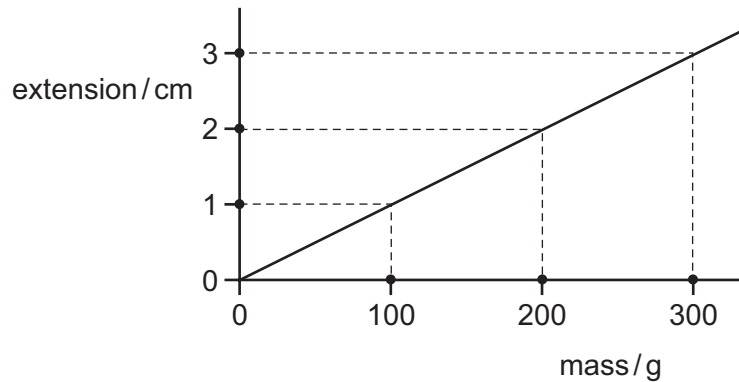
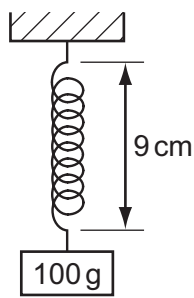
Which information can be obtained from the measuring cylinder readings?

- A** The difference between the readings gives the density of stone.
B The difference between the readings gives the volume of the stone.
C The final reading gives the density of stone.
D The final reading gives the volume of the stone.
- 2 When his parachute is fully opened, a parachutist falls towards the ground at a constant speed.
Under these conditions, which statement is correct?
- A** There are no forces acting on the parachutist.
B The upward force on the parachute is greater than the weight of the parachutist.
C The upward force on the parachute is equal to the weight of the parachutist.
D The upward force on the parachute is less than the weight of the parachutist.
- 3 A sledge of mass 25 kg is pulled across level ground with a horizontal force of 60 N. The constant force of friction is 20 N.

What is the acceleration of the sledge?

- A** 0.63 m/s^2 **B** 1.6 m/s^2 **C** 2.4 m/s^2 **D** 3.2 m/s^2

- 4 The diagrams show a spring having a length of 9 cm when loaded with a 100 g mass, and the extension-mass graph for the spring.



What is the length of the spring after the 100 g mass has been removed?

- A** 7 cm **B** 8 cm **C** 9 cm **D** 10 cm
- 5 Which type of energy is converted to thermal energy when atoms combine?

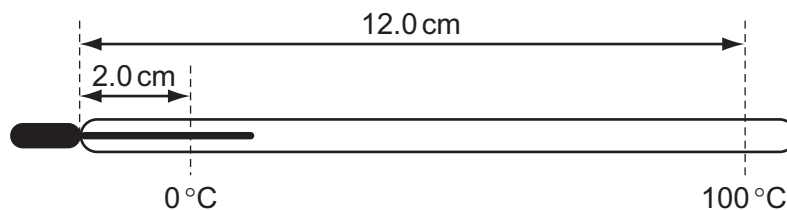
- A** chemical
B kinetic
C nuclear
D solar

- 6 A solid metal bar is heated at one end.

How is the thermal energy transferred to the other end of the bar?

- A** The heated molecules move along the bar, carrying all their energy to the other end.
B The heated molecules move along the bar, giving energy to other molecules as they pass.
C The heated molecules stay completely still but pass on their energy to other molecules.
D The heated molecules vibrate more rapidly and pass on energy to other molecules.

- 7 In a liquid-in-glass thermometer, the liquid column is 2.0 cm long at 0 °C and 12.0 cm long at 100 °C.



How long will the liquid column be at 30 °C?

- A** 2.3 cm **B** 3.0 cm **C** 5.0 cm **D** 9.0 cm

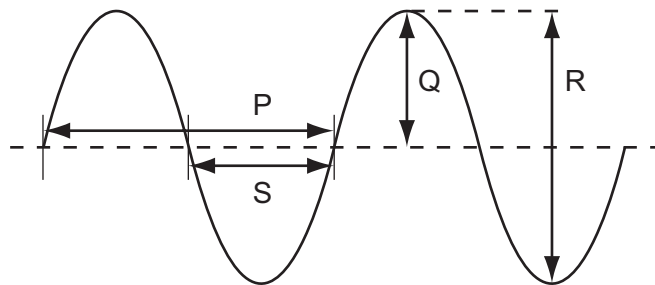
- 8 Equal volumes of four substances are heated at atmospheric pressure.

The temperature rise is the same for each substance.

Which substance expands the most?

- A air
- B mercury
- C steel
- D water

- 9 The diagram shows the surface of the water as a wave passes across a ripple tank.



Which lengths represent the amplitude and wavelength?

	amplitude	wavelength
A	Q	P
B	Q	S
C	R	P
D	R	S

- 10 A wave has a frequency of 10^4 Hz.

What are the possible values of its velocity and wavelength?

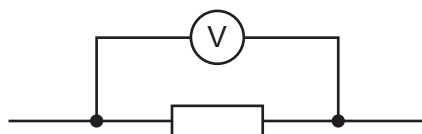
	velocity in m/s	wavelength in m
A	330	0.33
B	330	33
C	3×10^8	30
D	3×10^8	3×10^4

- 11 Which type of electromagnetic radiation travels at the highest speed through a vacuum?
- A gamma rays
 - B light waves
 - C radio waves
 - D none – all have the same speed

- 12 A lightning flash carries 25 C of charge and lasts for 0.01 s.

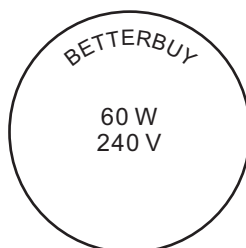
What is the current?

- A 0.0004 A B 0.25 A C 25 A D 2500 A
- 13 A voltmeter is connected across a resistor in an electrical circuit.



What does the reading on the voltmeter measure?

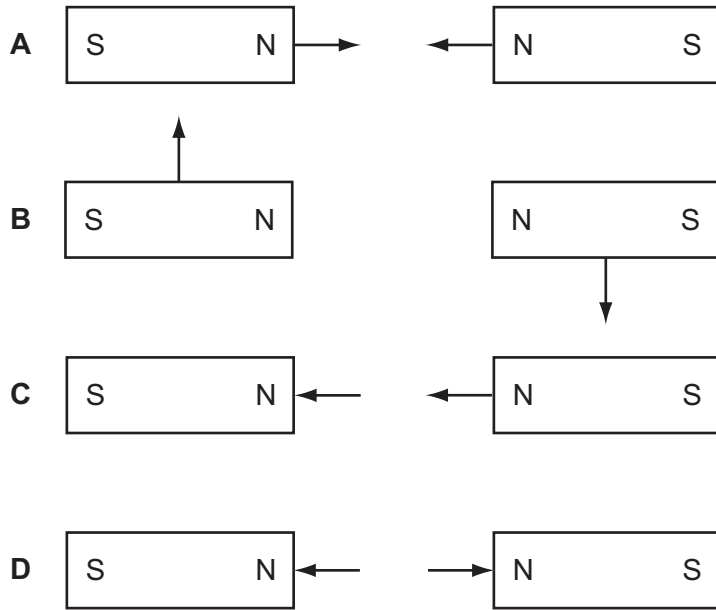
- A the work done in driving 1 A of current through the resistor
 - B the work done in driving 1 C of charge through the resistor
 - C the work done in driving 1 J of energy through the resistor
 - D the work done in driving 1 W of power through the resistor
- 14 A $1.0\ \Omega$ resistor and a $2.0\ \Omega$ resistor are connected in series across a 12 V d.c. supply.
- What is the current in the circuit?
- A 12 A B 6.0 A C 4.0 A D 0.25 A
- 15 The diagram shows some information printed on a light bulb.



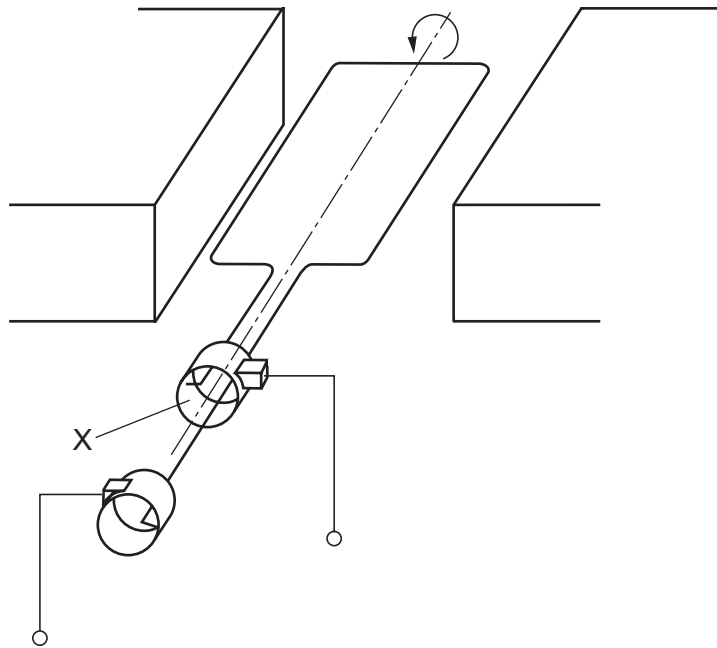
Which current is needed to light the bulb at normal brightness?

- A 0.25 A B 3.0 A C 4.0 A D 15 A

16 Which diagram shows the correct directions of the magnetic forces on two bar magnets?



17 The diagram shows a simple a.c. generator.



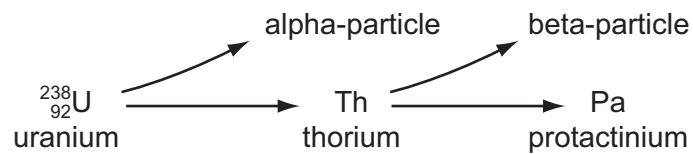
Which name is given to part X?

- A axle
- B carbon brush
- C magnet
- D slip ring

18 How many protons, neutrons and electrons are present in a neutral atom of sodium ${}_{11}^{23}\text{Na}$?

	protons	neutrons	electrons
A	11	12	11
B	11	23	11
C	12	11	12
D	12	23	12

19 The uranium atom ${}_{92}^{238}\text{U}$ emits an alpha-particle to become thorium, which then emits a beta-particle to become protactinium.

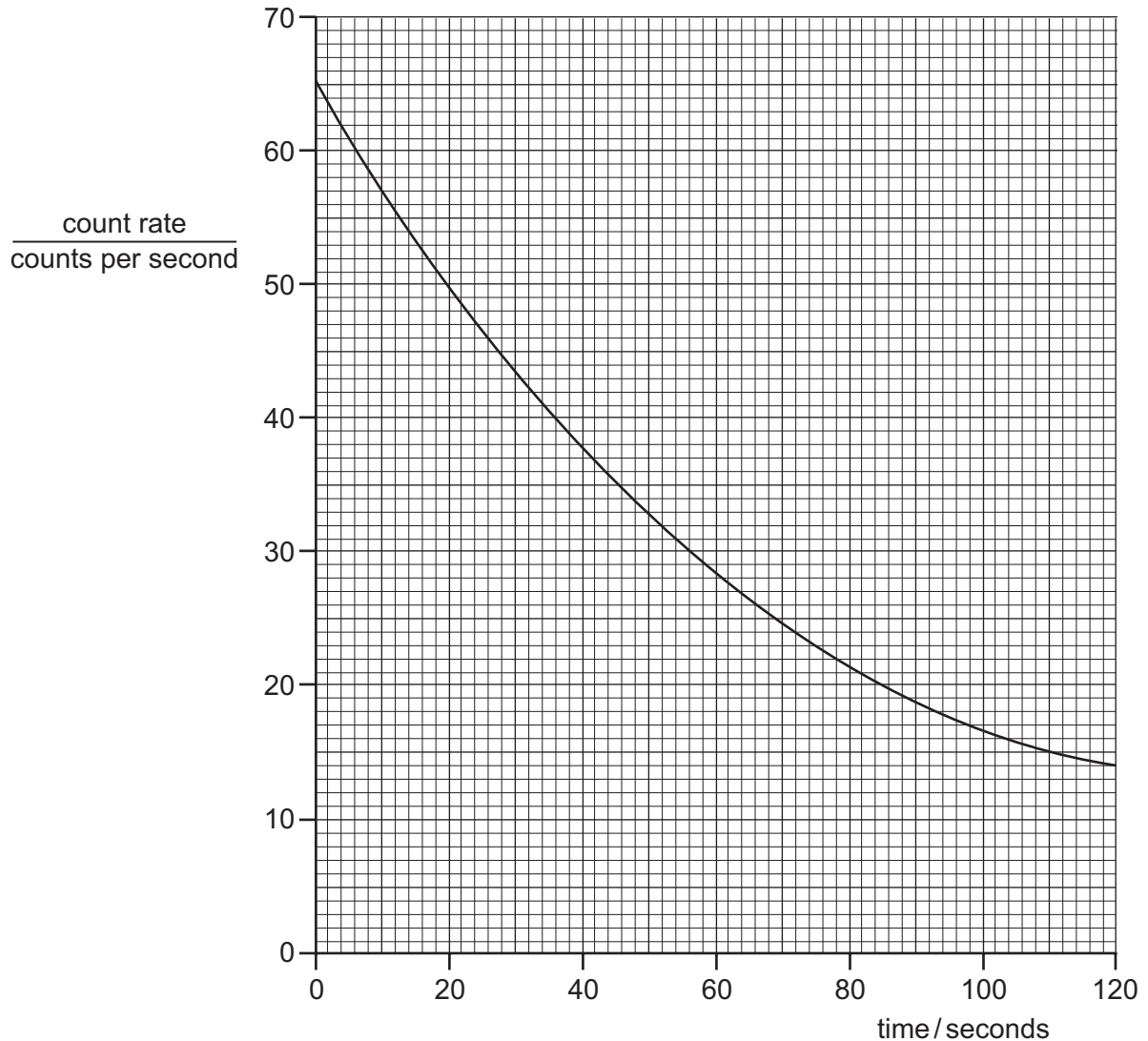


What is the proton number (atomic number) of protactinium?

- A** 89 **B** 90 **C** 91 **D** 95

- 20 Ra decays with a half-life of 1600 s.
 Rn decays with a half-life of 52 s.
 Po decays with a half-life of 9.1 s.
 Pb decays with a half-life of 10.6 h.

The changing count rate for one of these radioactive nuclides is shown in the graph.



From the half-life shown by the graph, which was the decaying radioactive nuclide?

- A** Ra **B** Rn **C** Po **D** Pb
- 21 Which cell structure contains the light-absorbing pigments in plants?

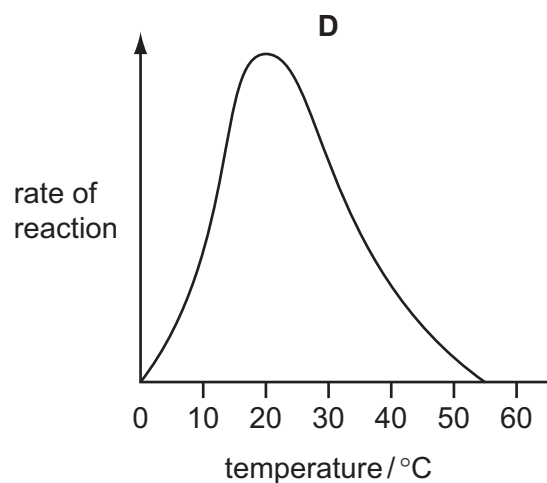
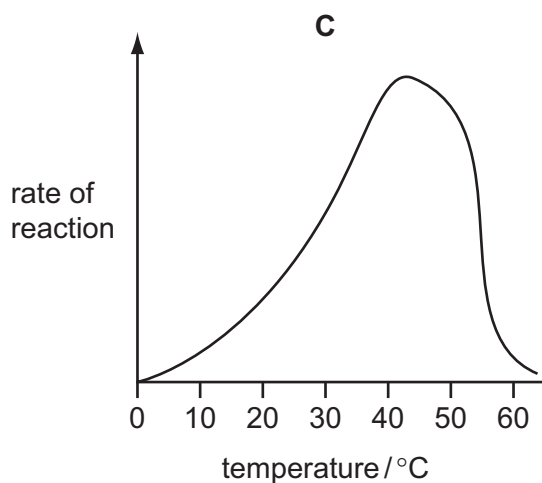
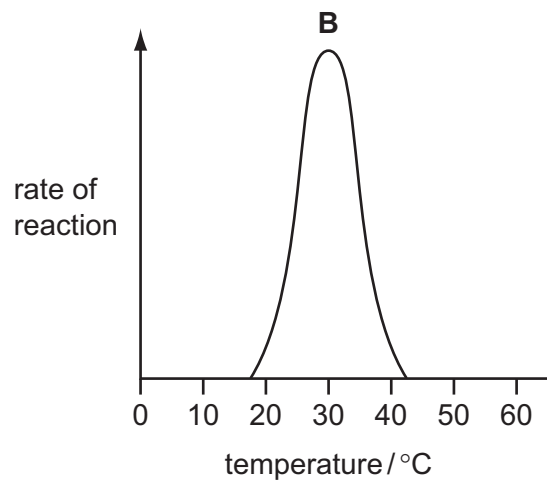
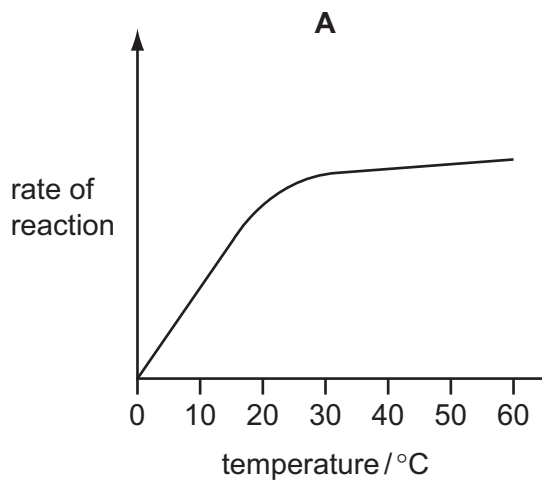
- A** chloroplast
B cytoplasm
C nucleus
D vacuole

22 A human red blood cell is placed in a strong salt solution.

In which direction does water move and what is the effect on the cell?

	movement of water	effect on cell
A	into the cell	slight increase in size
B	into the cell	cell bursts
C	out of the cell	slight decrease in size
D	out of the cell	no change in cell volume

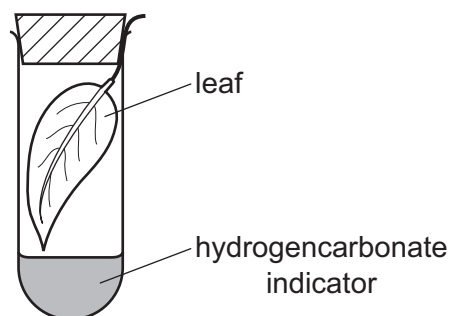
23 Which graph shows the effect of temperature on enzyme-controlled reactions?



24 How does most carbon dioxide reach the photosynthesising cells of a leaf?

- A through the cuticle
- B through the epidermis
- C through the stomata
- D through the xylem

25 A freshly picked leaf is placed in a sealed test-tube with some hydrogencarbonate indicator solution. The indicator changes colour as shown.



colour	amount of carbon dioxide
purple	less than normal
red	normal
yellow	more than normal

Which colour will the hydrogencarbonate indicator be at midday and at midnight?

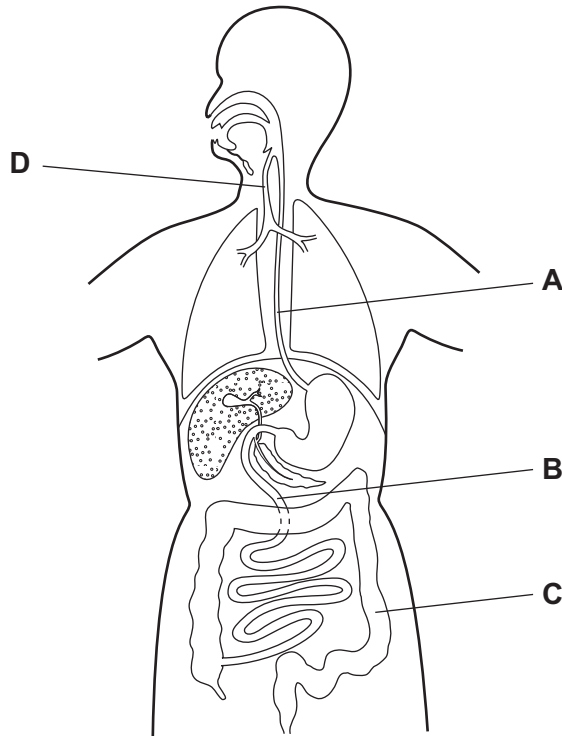
	at midday	at midnight
A	purple	yellow
B	red	purple
C	yellow	purple
D	yellow	red

26 Which part of the alimentary canal is most acidic?

- A colon
- B ileum
- C mouth
- D stomach

27 The diagram shows some organs of the human body.

Which structure does **not** move its contents by peristalsis?



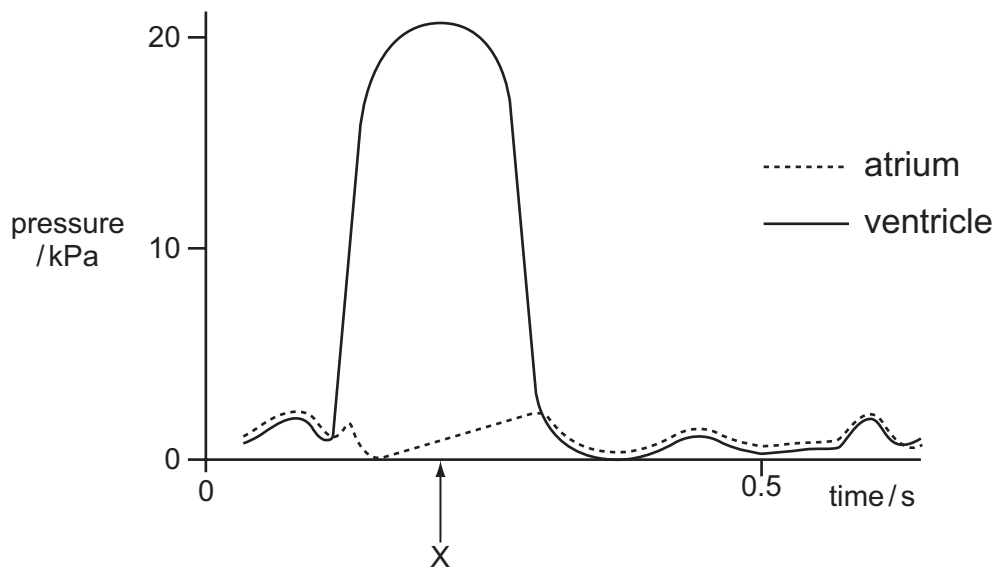
28 Four similar leafy shoots are exposed to different conditions. The rates of water uptake and the rates of water loss are measured.

The results are shown in the table.

Which shoot is most likely to wilt?

	water uptake /mm ³ per min	water loss /mm ³ per min
A	10	12
B	10	8
C	5	5
D	5	2

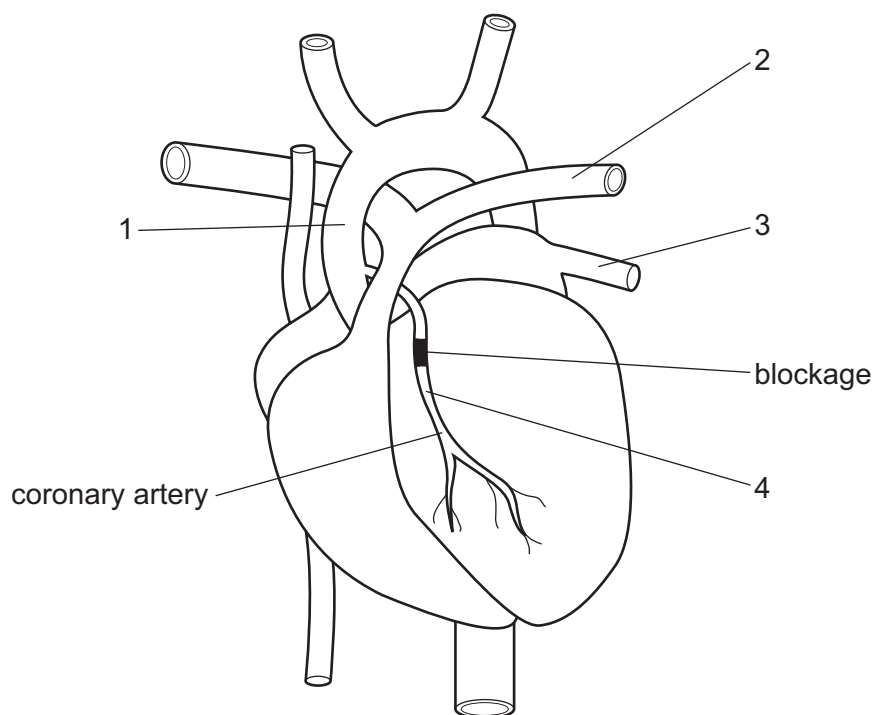
- 29 The graph shows pressure changes in the left atrium and in the left ventricle during one heartbeat.



What is the state of the valves at time X?

	bicuspid valve	semi-lunar valve (in aorta)
A	closed	closed
B	closed	open
C	open	closed
D	open	open

- 30 The diagram shows an external view of the heart of a patient with a blockage of the coronary artery. This could be treated by inserting a tube to by-pass the blockage.



Which two vessels would be joined by this tube?

- A** 1 and 2 **B** 1 and 4 **C** 2 and 4 **D** 3 and 4
- 31 The table shows the percentage composition of four samples of air.

Which sample could have been breathed out by a person after vigorous exercise?

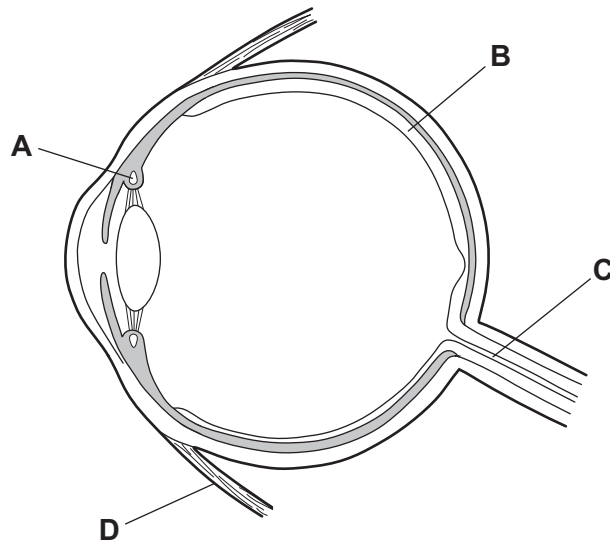
	oxygen	carbon dioxide	water vapour
A	16	0.3	saturated
B	16	4	saturated
C	21	0.03	trace
D	21	3	trace

- 32 What is **not** an excretory product of mammals?

- A** carbon dioxide in expired air
B undigested food in faeces
C urea in sweat
D urea in urine

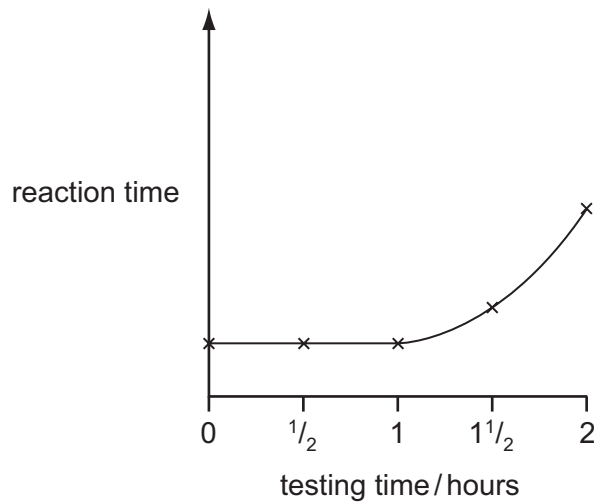
33 The diagram shows a section through an eye.

Which part helps to focus an image on the retina?



34 An experiment was carried out in which the reaction time for a person to respond to seeing a light was measured. Every half hour the person was given an alcoholic drink and the test was repeated.

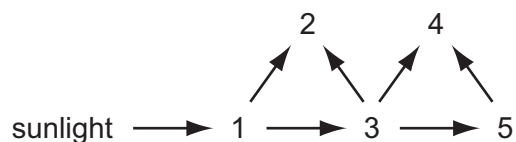
The results over two hours are shown in the diagram below.



Which deduction can be made from the experiment?

- A Alcoholic drinks make the person react more slowly.
- B Mental activities are stimulated by small quantities of alcohol.
- C The alcohol content of the blood rises rapidly after 1 hour.
- D The person reacts more quickly as a result of practice.

35 The diagram shows energy flow in a food web.

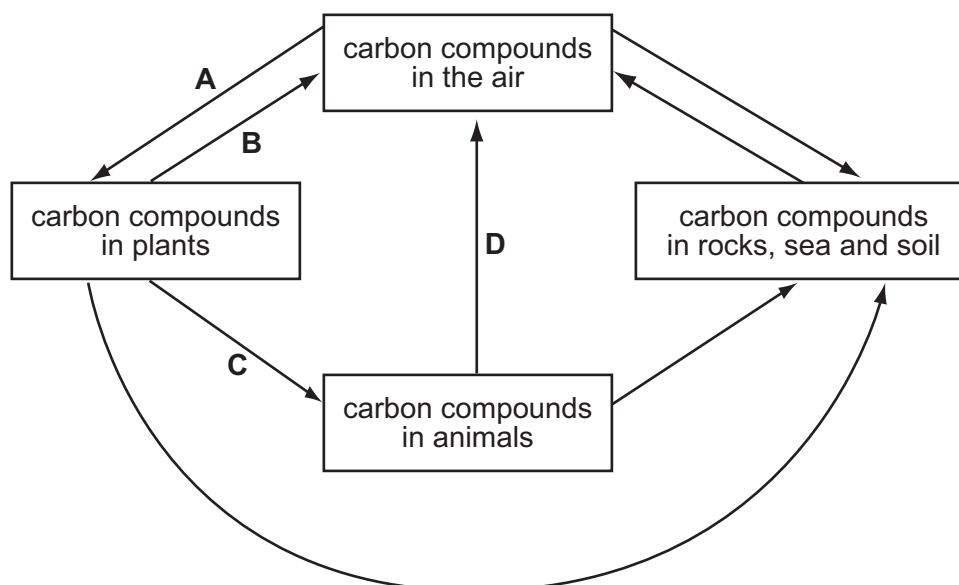


Which number represents an organism that eats both plants and animals?

- A 2 B 3 C 4 D 5

36 The diagram shows part of the carbon cycle.

Which arrow represents photosynthesis?



37 What increases the risk of famine?

- A decreased air pollution
 B decreased population size
 C increased carbon dioxide concentration in the air
 D increased soil erosion

38 Which statement is true of asexual reproduction in plants?

- A Insects are needed to transfer pollen.
 B New plants grow from seeds.
 C Offspring are genetically identical to their parents.
 D Two types of gametes are involved.

39 What is the path taken by sperm cells during ejaculation from the male reproductive system?

- A sperm duct → testis → urethra
- B sperm duct → urethra → testis
- C testis → sperm duct → urethra
- D testis → urethra → sperm duct

40 The genotype for the height of an organism is written as Tt.

Which conclusion may be drawn?

- A The allele for height has at least two different genes.
- B The gene for height has at least two different alleles.
- C There are two different genes for height, each having a single allele.
- D There are two different alleles for height, each having a single gene.

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