CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (PHYSICS, BIOLOGY) **5125/01**

Paper 1 Multiple Choice

October/November 2003

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

Read very carefully the instructions on the answer sheet.

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.

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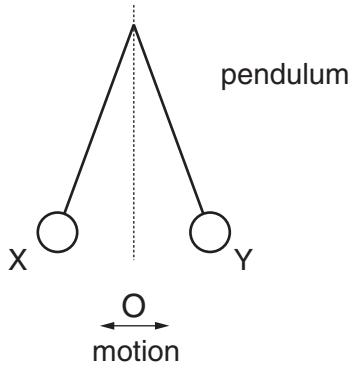
UNIVERSITY *of* CAMBRIDGE
Local Examinations Syndicate

1 The diagram shows a simple pendulum. It swings between X and Y.



Which sequence should be timed to measure the period of the pendulum?

A X → O

B X → Y

C X → Y → O

D X → Y → X

2 An object falls through a vacuum where there is no air resistance.

Which line in the table describes the acceleration and velocity of the object?

	acceleration	velocity
A	constant	constant
B	constant	increasing
C	increasing	constant
D	increasing	increasing

3 An astronaut has a mass of 80 kg on Earth. He can jump 10 cm high off the surface of the Earth.

When he is on the Moon he can jump higher than this.

This is because, on the Moon,

A his mass is smaller than on Earth.

B his weight is greater than on Earth.

C his weight is smaller than on Earth.

D his weight is the same as on Earth.

4 A stone of mass 400 g is lowered into a measuring cylinder containing water.

The water level rises from 300 cm^3 to 500 cm^3.

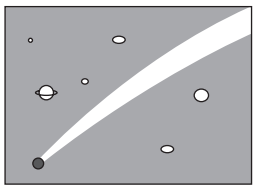
What is the density of the stone?

A 0.50 g / cm^3 **B** 0.80 g / cm^3 **C** 1.33 g / cm^3 **D** 2.0 g / cm^3

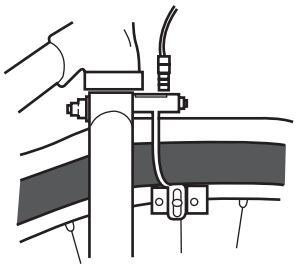
5 The diagrams show some effects which are all due to the same cause.

a parachutist reaching terminal velocity

a meteor glowing as it falls through the atmosphere



brakes slowing down a bicycle



What causes these effects?

A friction

B heat

C mass

D weight

6 A ball of mass 100 g is balanced on the edge of a ledge 10 m above the ground. It rolls off the ledge and falls.

How much gravitational potential energy is lost when the ball falls to the ground?
(gravitational field strength = 10 N / kg.)

A 10 J **B** 100 J **C** 1000 J **D** 10 000 J

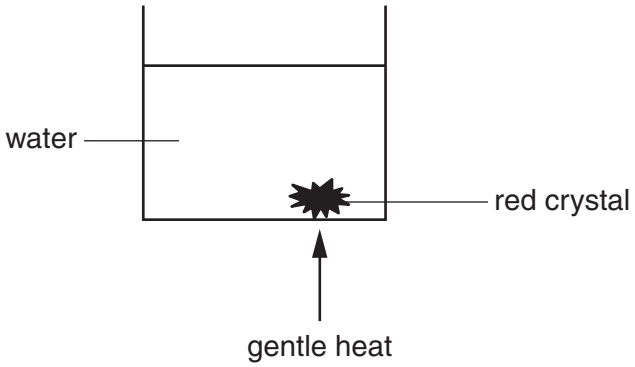
7 Which substance in the table is liquid at 20 °C?

substance	melting point / °C	boiling point / °C
A	–218	–183
B	–39	357
C	44	280
D	119	444

[Turn over

8 A beaker of water contains a red crystal which slowly dissolves.

Gentle heat is applied below the crystal.



The red colour is seen to rise.

What is the name of this process?

A evaporation

B conduction

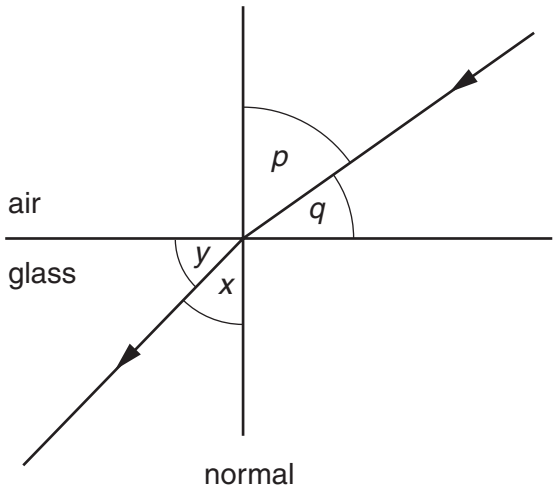
C convection

D radiation

9 Which of the following correctly describes the natures of sound, light and radio waves?

	sound	light	radio
A	longitudinal	transverse	longitudinal
B	longitudinal	transverse	transverse
C	transverse	longitudinal	longitudinal
D	transverse	longitudinal	transverse

10 The diagram shows a ray of red light passing from air into glass.



Which ratio gives the refractive index for red light?

A $\frac{\sin p}{\sin x}$

B $\frac{\sin p}{\sin y}$

C $\frac{\sin q}{\sin x}$

D $\frac{\sin q}{\sin y}$

11 Which of the following, in the electromagnetic spectrum, has the shortest wavelength?

A infrared

B microwave

C radio

D ultra-violet

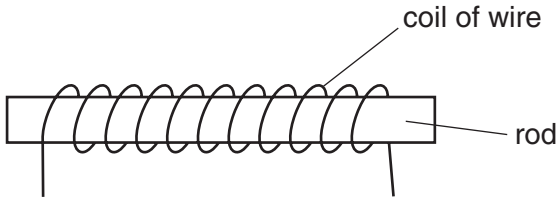
12 A loud sound is made in front of a tall building.

An echo is heard 4 seconds after the sound is produced.

If the speed of sound in air is 320 m / s, how far away is the building?

A 80 m **B** 160 m **C** 640 m **D** 1280 m

13 An experiment was carried out using four rods made of different materials. These were placed, in turn, in a coil of wire.



A large direct current was passed through the coil for a few seconds and was then switched off.

As a result one of the rods was **permanently** magnetised by this experiment.

Which material?

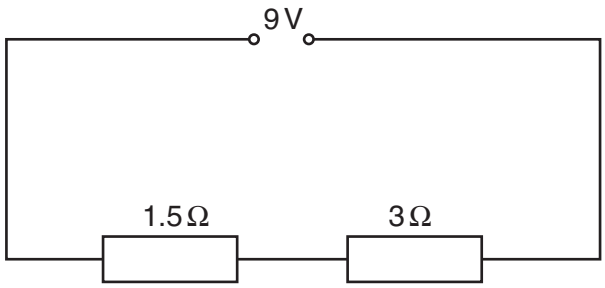
A glass

B iron

C plastic

D steel

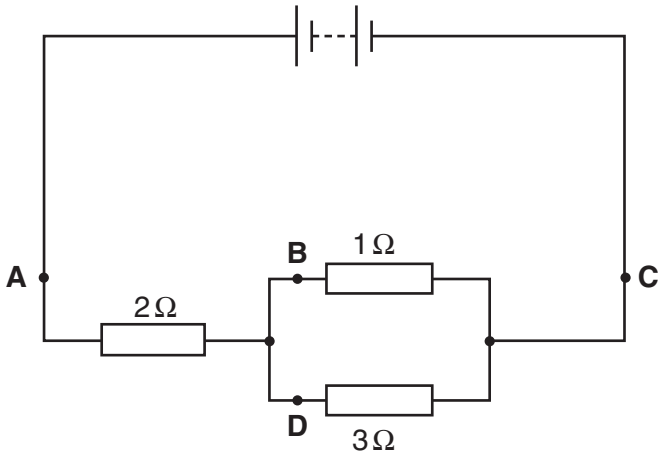
14 Two resistors are connected in series with a 9 volt supply.



What is the current flowing in the circuit?

A 2.0 A **B** 3.0 A **C** 4.5 A **D** 6.0 A

15 At which point in this circuit is the current the smallest?



16 What should be the rating for a fuse used in the plug of an electric heater?

A just less than the normal heater current

B exactly equal to the normal heater current

C just greater than the normal heater current

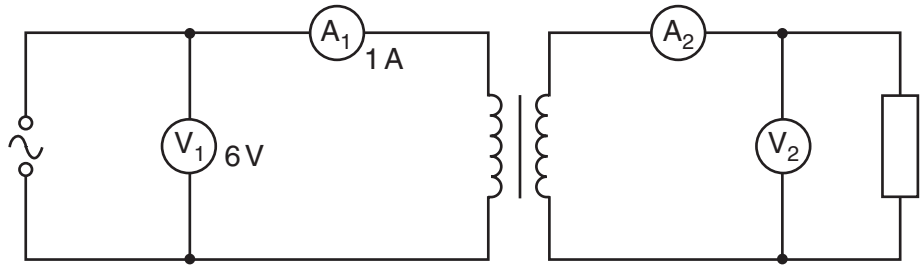
D much greater than the normal heater current

17 Four electrical appliances are left switched on for different times.

In which appliance is the greatest amount of energy converted?

	appliance	time / h
A	100 W light bulb	12.0
B	1 kW fan	3.0
C	1.5 kW hot-plate	1.5
D	3 kW water heater	0.5

18 The diagram shows a 100 % efficient **step-up** transformer.



Which pair of readings are possible on meters V_2 and A_2?

	V_2	A_2
A	0.6	0.1
B	0.6	10.0
C	60.0	0.1
D	60.0	10.0

19 A sample contains 12 000 radioactive atoms of a particular nuclide.

After an interval of two half-lives, how many atoms have disintegrated?

A 0 **B** 3000 **C** 6000 **D** 9000

20 How many neutrons and protons does one atom of substance ${}^{A}_{Z}X$ have in its nucleus?

	number of neutrons	number of protons
A	Z - A	A
B	A - Z	Z
C	Z	A
D	A	Z

21 Which structures are present in animal cells?

	cell membrane	cell wall	cytoplasm
A	✗	✔	✔
B	✔	✗	✔
C	✔	✔	✗
D	✔	✔	✔

key

✔ = structure present
✗ = structure absent

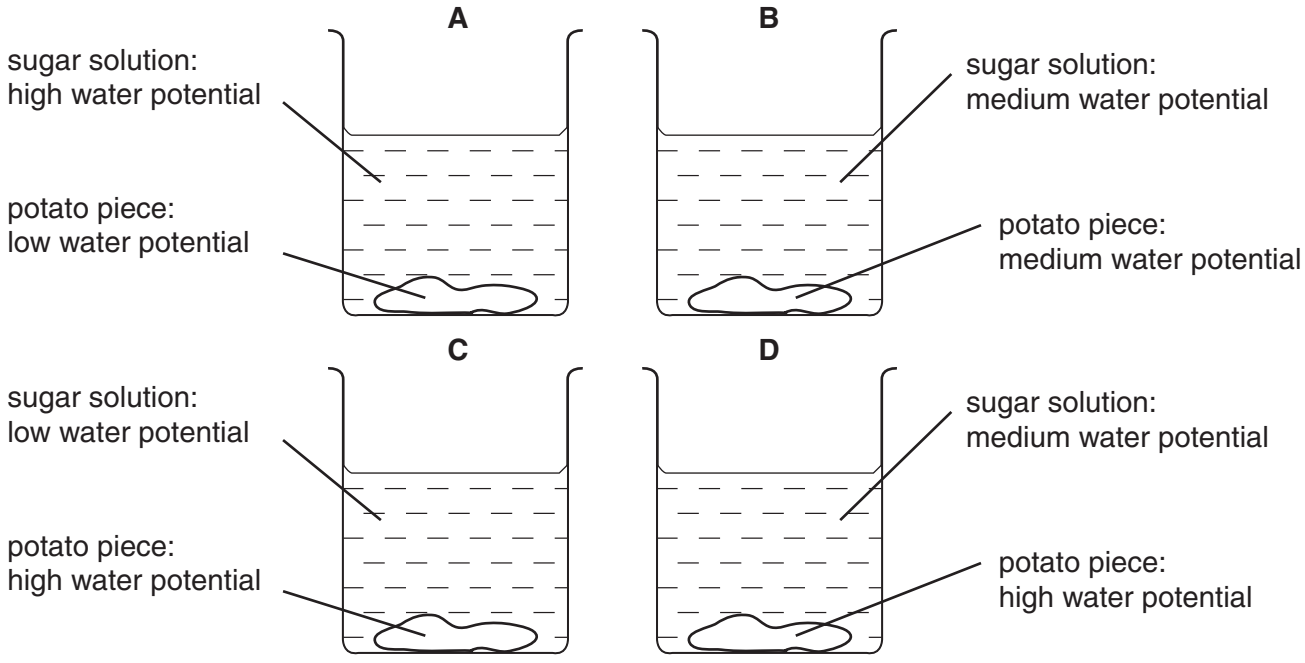
22 The table shows the main functions of red blood cells and root hair cells.

Which row is correct?

	red blood cell	root hair cell
A	absorption	absorption
B	absorption	transport
C	transport	absorption
D	transport	transport

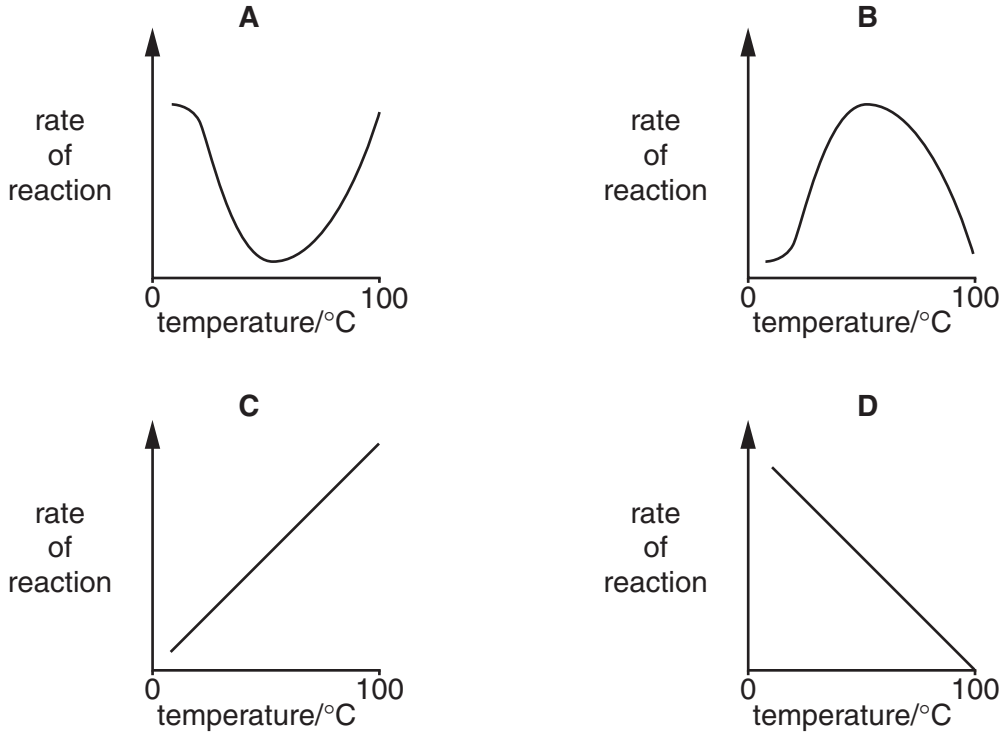
23 The diagrams show some pieces of potato in four sugar solutions of different water potential.

In which solution will the potato piece take up water from the solution and swell?



[Turn over

24 Which graph shows the effect of temperature on an enzyme-controlled reaction?



25 The word equation represents the overall chemical reactions of photosynthesis.

Which labelled substance traps light energy?

A carbon dioxide + **B** water $\xrightarrow{\text{**C** chlorophyll}}$ **D** sugar + oxygen

26 Which substances do plants make using nitrate ions?

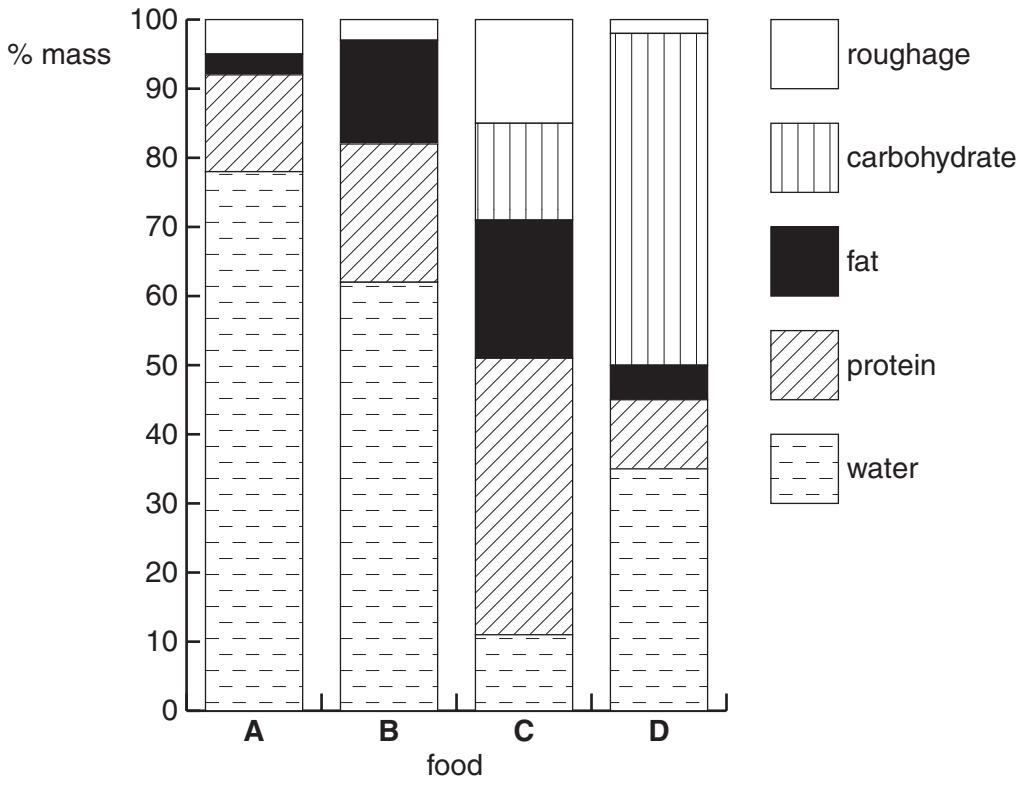
	proteins	starch	sugar
A	✔	✗	✗
B	✔	✔	✗
C	✗	✔	✔
D	✗	✗	✔

key

✔ = nitrate used
✗ = nitrate not used

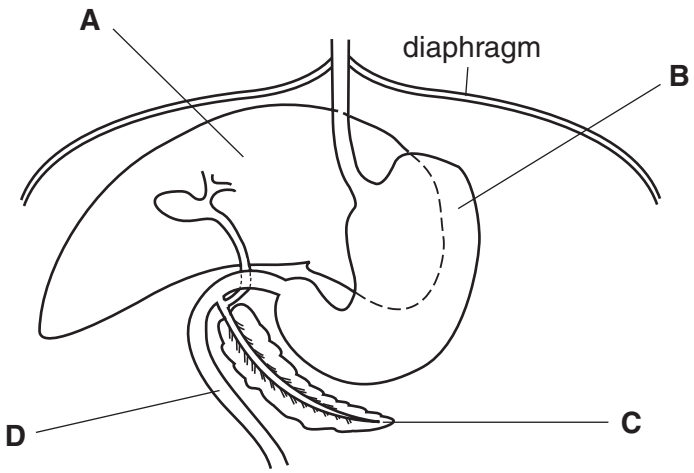
27 The diagram shows the results of analysing four foods.

Which food will provide the most energy per gram?



28 The diagram shows part of the human digestive system.

Which part secretes an acidic digestive juice containing a protease?



[Turn over

29 A plant stem was dissected into a number of different tissues. Each tissue was tested for the presence of starch, protein and reducing sugar. The results are shown in the table.

Which tissue is xylem?

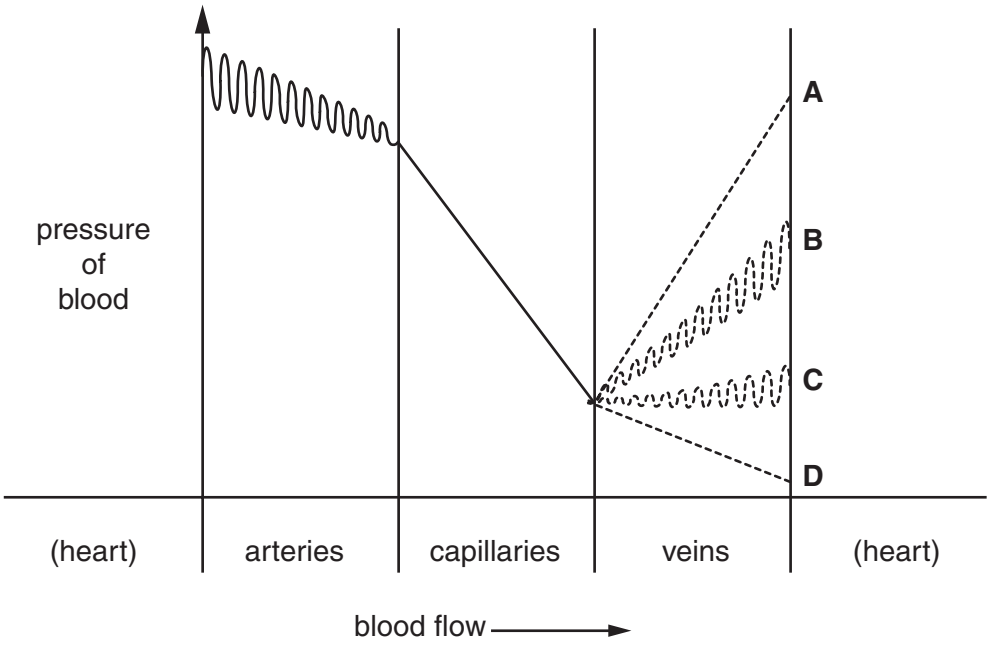
	starch	protein	sugar
A	✔	✗	✔
B	✔	✗	✗
C	✗	✔	✔
D	✗	✗	✗

key

✔ = substance present
✗ = substance absent

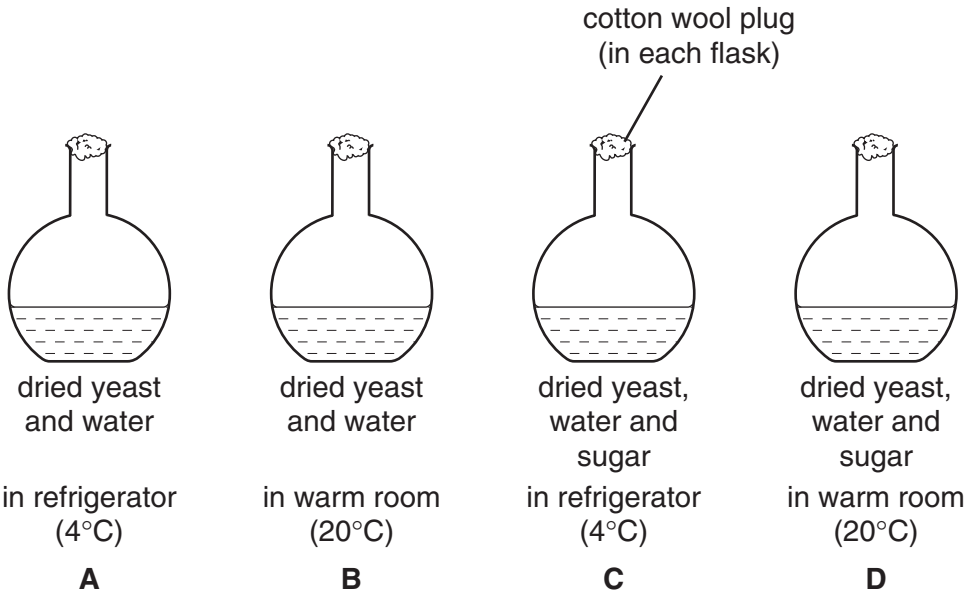
30 The diagram shows the pressure of blood after it leaves the heart and passes through arteries and then capillaries.

Which dotted line shows the pressure of blood as it flows through veins before returning to the heart?

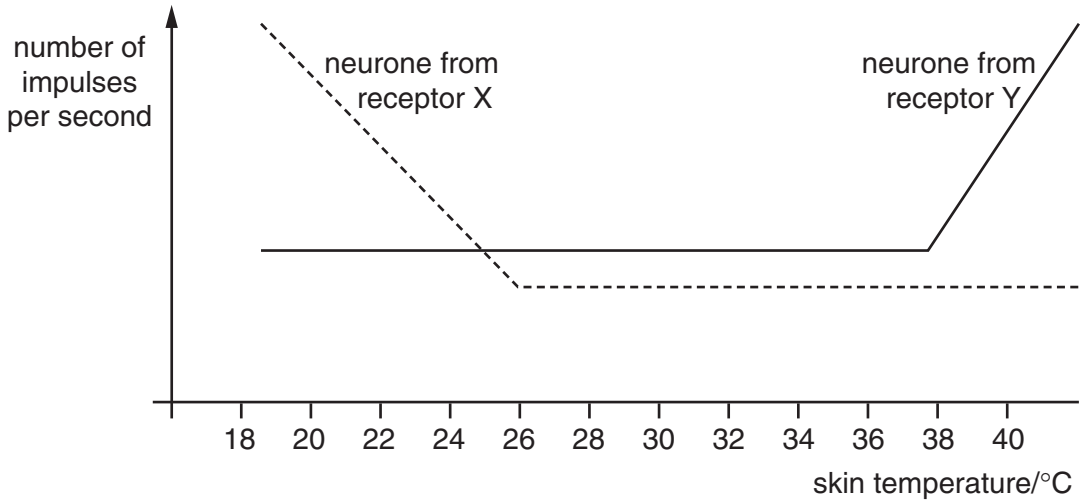


31 Four flasks were sterilised and set up as shown in the diagram.

Which flask will show signs of fermentation (anaerobic respiration) after one hour?



32 The graph shows the number of nerve messages (impulses) per second travelling along two sensory neurones from the skin to the brain, at different skin temperatures.



What does the graph show?

A Receptor X responds most strongly to temperatures above 26 °C.

B Receptor Y responds most strongly to temperatures below 26 °C.

C Receptors X and Y respond most strongly between 26 °C and 38 °C.

D Receptors X and Y respond most strongly outside the temperature range of 26 °C to 38 °C.

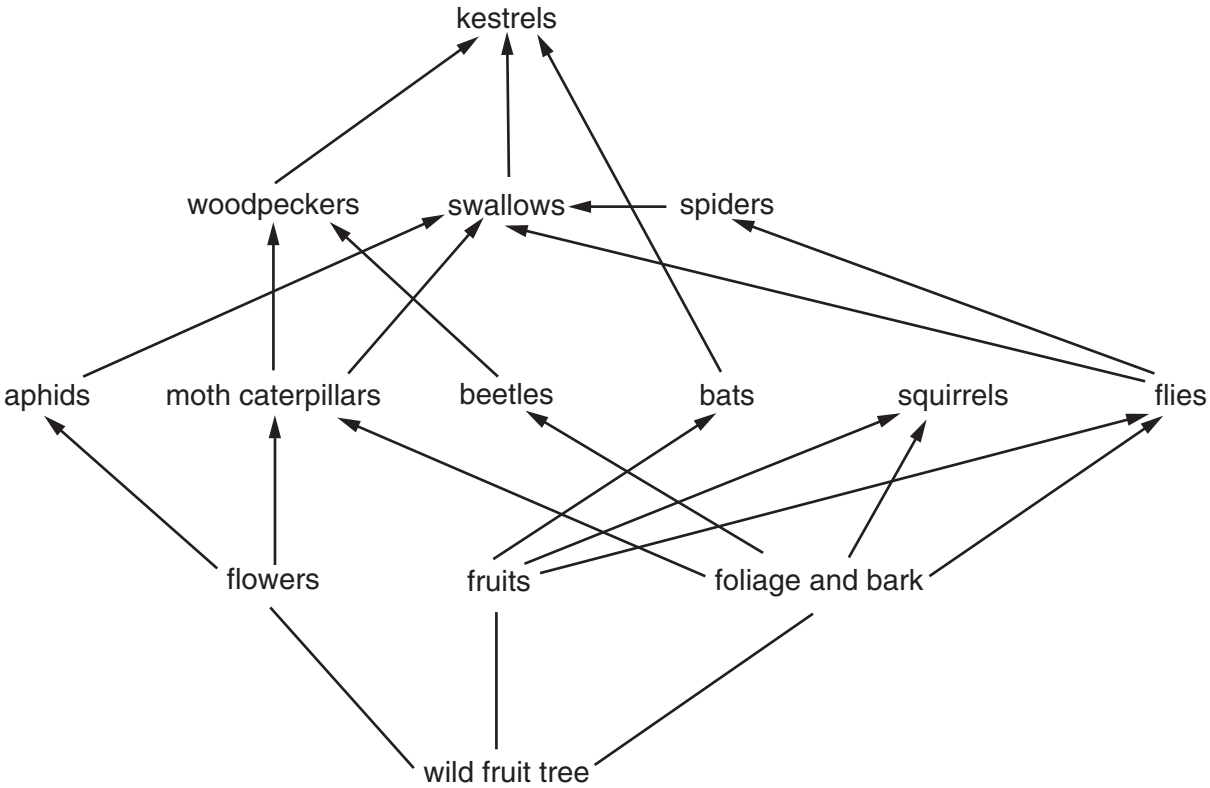
33 Which substances are depressant drugs?

	alcohol	heroin	penicillin
A	✔	✔	✔
B	✔	✔	✗
C	✔	✗	✔
D	✗	✔	✔

key

✔ = depressant
✗ = not a depressant

34 The diagram shows a food web on a wild fruit tree.



Which animals would be most affected, if the flowers of the tree were **not** pollinated?

A aphids

B bats

C kestrels

D squirrels

35 When does an ecosystem such as a tropical rainforest absorb or release carbon dioxide?

	in daylight	in darkness
A	absorbs	absorbs
B	absorbs	releases
C	releases	absorbs
D	releases	releases

36 In recent years, important rivers in many parts of the world have become more acidic.

What has caused this change?

A air pollution by sulphur dioxide

B heavy metals

C increased use of insecticides

D increased use of nitrate fertilisers

37 Which of these effects of Man on the ecosystem is reduced by proper treatment of sewage?

A acid rain

B death of fish due to lack of oxygen

C increase of carbon dioxide in the atmosphere

D lack of soil minerals

38 Which structures protect the flower when it is a bud?

A anthers

B carpels

C petals

D sepals

39 What is happening when gametes are released by the human female?

A fertilisation

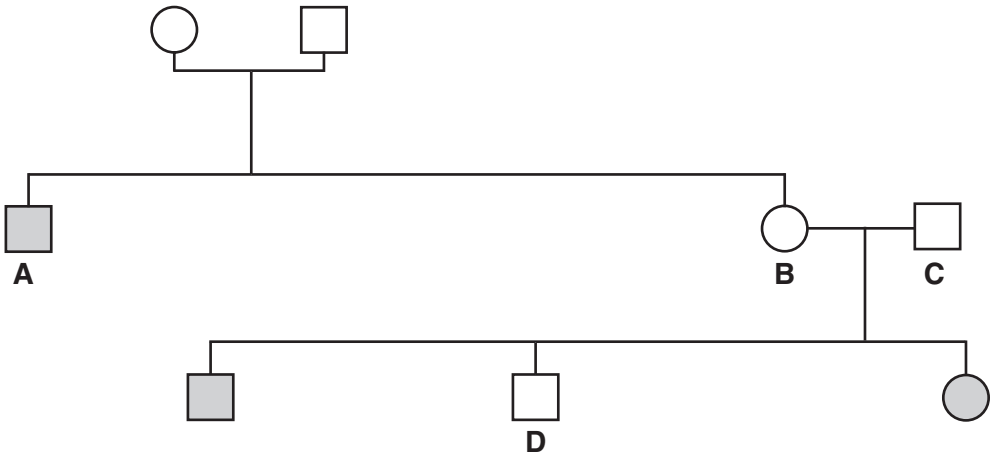
B implantation

C menstruation

D ovulation

40 The diagram shows a family tree in which some members have sickle cell anaemia.

Which person could have two alleles for sickle cell anaemia?



male with sickle cell anaemia

female with sickle cell anaemia

male free of the disease

female free of the disease