



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

May/June 2013

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.

DO NOT WRITE IN ANY BARCODES.

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.

A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

This document consists of **15** printed pages and **1** blank page.



- 1 When a red stain is added to a culture containing both living and dead cells, only the dead cells take up the stain.

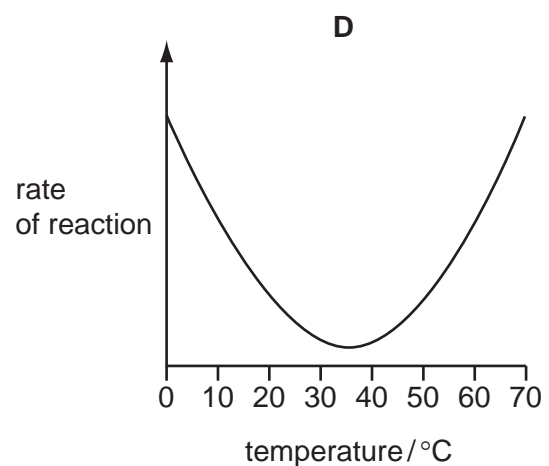
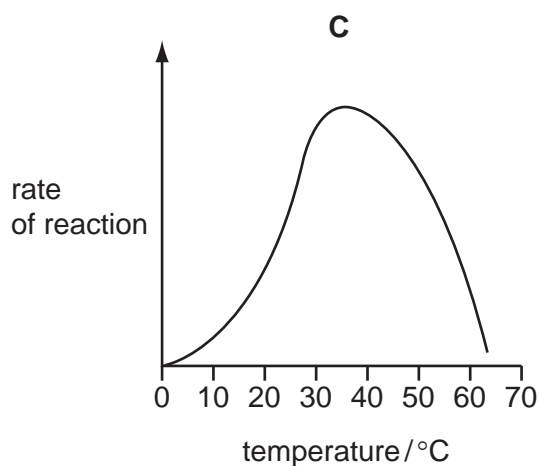
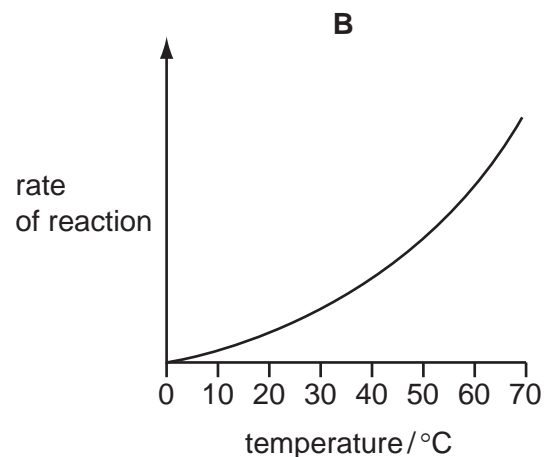
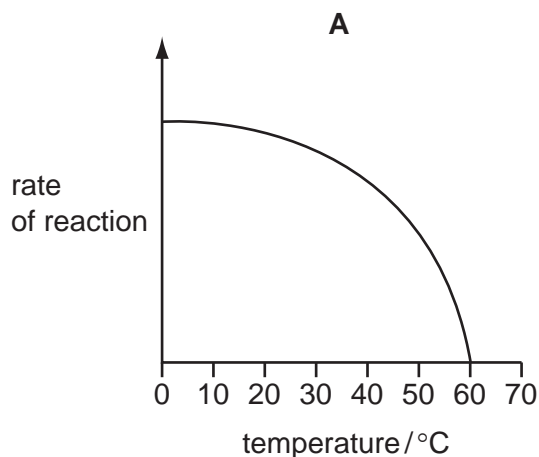
Which structure prevents the stain entering the living cells?

- A cell membrane
- B cell wall
- C cytoplasm
- D vacuole

- 2 What causes water to enter plant roots from the soil?

- A Water concentrations in root hairs and the soil are equal.
- B Water concentrations in root hairs and xylem are equal.
- C Water concentration in root hairs is higher than in the soil.
- D Water concentration in root hairs is lower than in the soil.

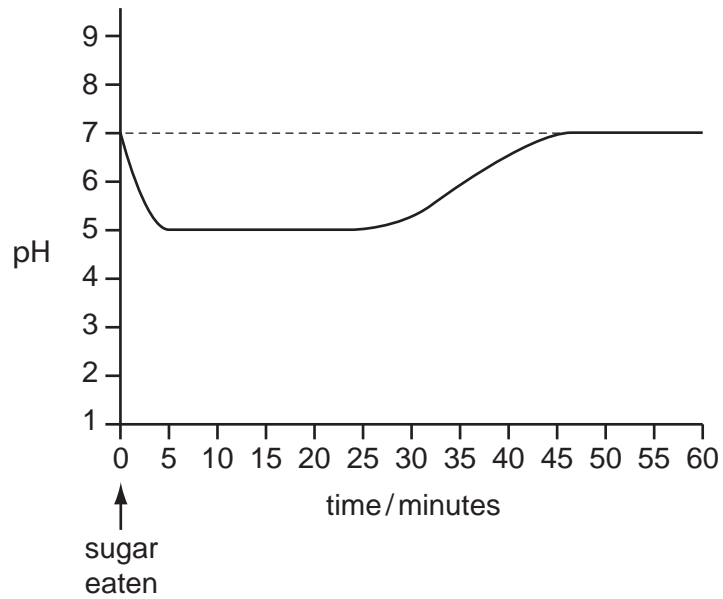
- 3 Which graph shows how the activity (rate of reaction) of an enzyme-catalysed reaction in the alimentary canal varies with temperature?



4 Where does most photosynthesis occur in a typical leaf?

- A epidermis
- B guard cells
- C palisade mesophyll
- D spongy mesophyll

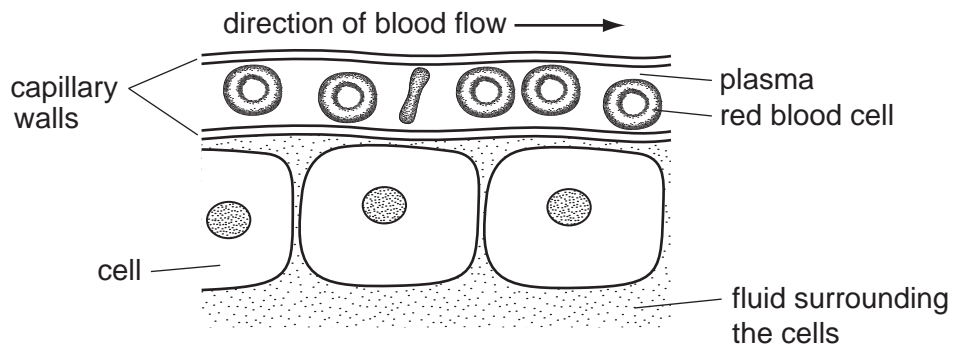
5 The graph shows changes to the pH of the saliva in the mouth after eating sugar.



When are conditions in the mouth most likely to cause tooth decay?

- A 0-5 minutes
- B 5-25 minutes
- C 25-45 minutes
- D 45-60 minutes

6 The diagram shows a blood capillary close to some cells.



Which row shows the type of nutrient in the plasma and in the fluid surrounding the cells, and the method of transfer between the two?

	plasma	fluid surrounding the cells	method of transfer
A	glucose	glucose	diffusion
B	glucose	glucose	osmosis
C	starch	starch	absorption
D	starch	starch	osmosis

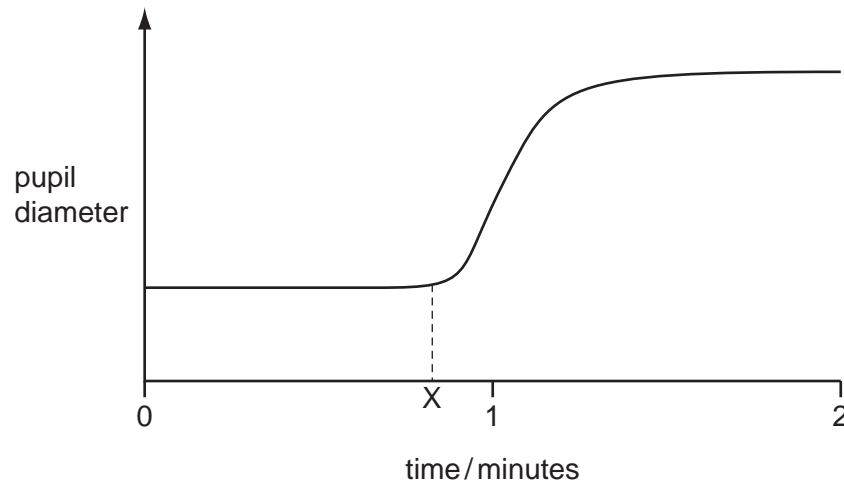
7 What is produced during anaerobic respiration in a muscle cell?

- A** carbon dioxide only
- B** carbon dioxide and lactic acid
- C** carbon dioxide and water
- D** lactic acid only

8 How does blood leaving the kidneys compare to blood entering the kidneys?

	carbon dioxide concentration	urea concentration
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

- 9 The graph shows how the diameter of the pupil of a person's eye changes during the course of two minutes.

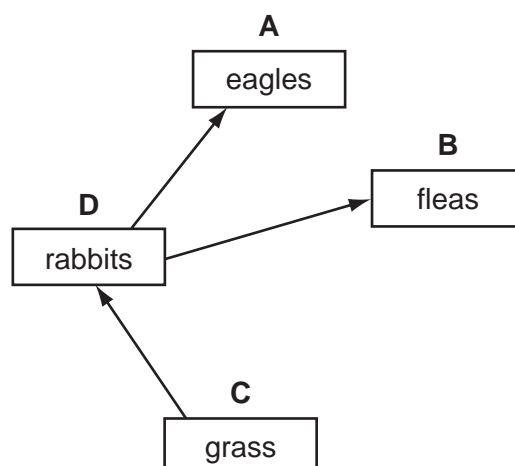


What happens to the light intensity and the pupil diameter immediately after time X?

	light intensity	pupil diameter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

- 10 The diagram shows part of a food web.

Which organism is a producer?



11 Some trees are cut down in a forest.

Which will increase the amount of carbon dioxide in the atmosphere most?

	use of soil	use of trees
A	left bare	allowed to decompose
B	left bare	to build furniture
C	to grow crops	allowed to decompose
D	to grow crops	to build furniture

12 What can be used in the successful treatment of syphilis?

	antibiotics	anti-viral drugs	condoms
A	✓	x	✓
B	✓	x	x
C	x	✓	✓
D	x	✓	x

key

✓ = used

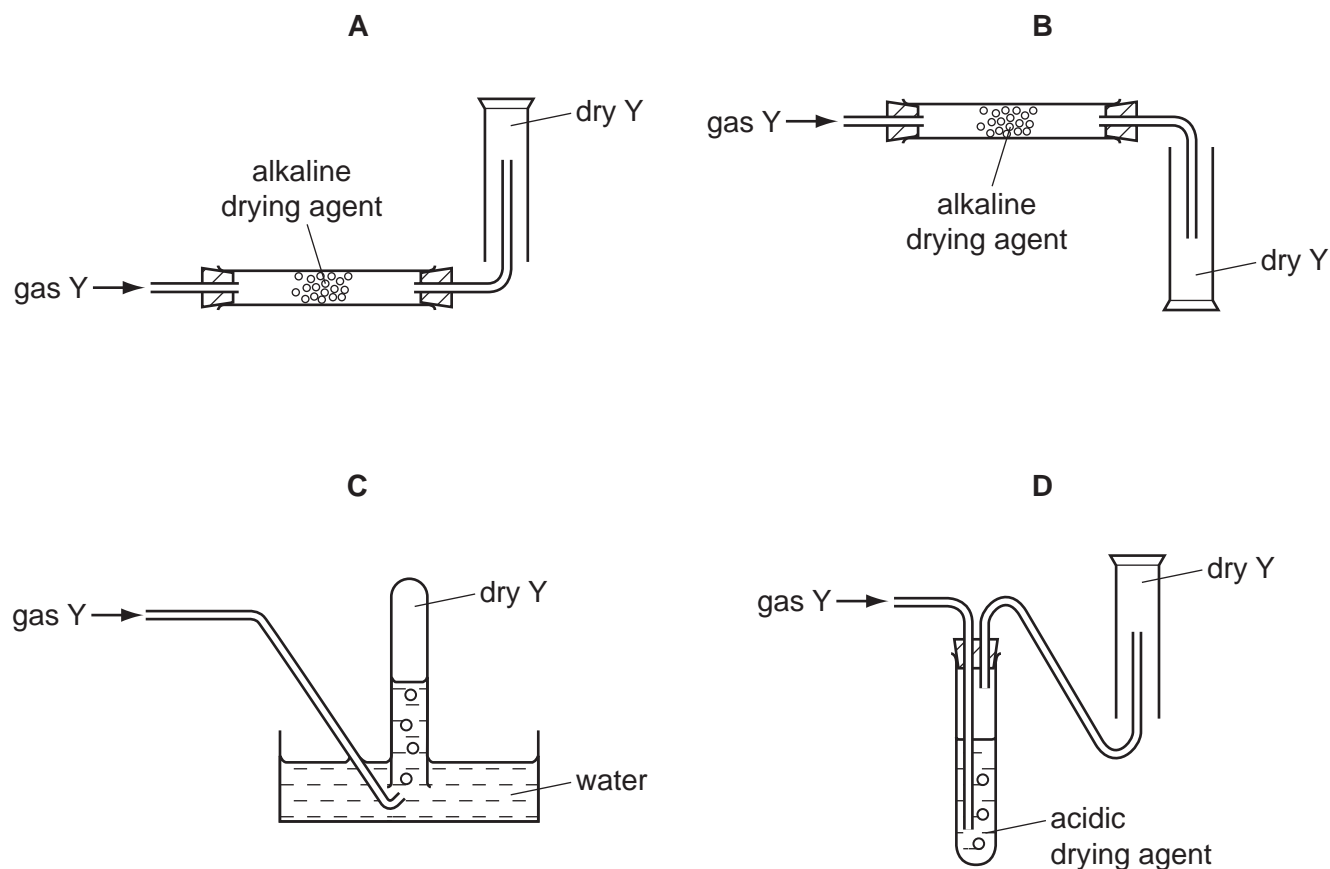
x = not used

13 Which method of birth control helps to prevent the spread of human immuno-deficiency virus (HIV)?

- A** chemical (spermicides)
- B** hormonal
- C** mechanical
- D** surgical

14 Gas Y is less dense than air and very soluble in water, forming an alkaline solution.

Which method is used to collect a dry sample of the gas?



15 Chlorine consists of two naturally occurring isotopes, ${}_{17}^{35}\text{Cl}$ and ${}_{17}^{37}\text{Cl}$.

These two isotopes have different

- A arrangements of their electrons.
- B chemical properties.
- C numbers of neutrons.
- D numbers of protons.

16 Magnesium bromide has the formula MgBr_2 .

How is the bond between atoms formed?

- A Each atom of magnesium shares two electrons, one with each of the two bromine atoms.
- B Each atom of magnesium transfers two electrons, one to each of the two bromine atoms.
- C Each bromine atom transfers two electrons to a magnesium atom.
- D Two bromine atoms transfer one electron each to a magnesium atom.

17 Which substance is most likely to be a covalent compound?

	boiling point /°C	conduction of electricity when liquid	solubility in water
A	-85	none	soluble
B	-62	none	insoluble
C	1413	good	soluble
D	2977	good	insoluble

18 An ionic compound is formed when metal M combines with non-metal X.

This compound contains the ions M^{4+} and X^{3-} .

What is the formula of the compound?

- A** M_2X_3 **B** M_3X_2 **C** M_3X_4 **D** M_4X_3

19 The salt copper sulfate is prepared by adding excess copper(II) oxide (an insoluble base) to sulfuric acid.

How is the excess copper(II) oxide removed?

- A** crystallisation
B distillation
C evaporation
D filtration

20 Elements X and Y are in Group VII of the Periodic Table.

X is a liquid at room temperature. Y is a solid at room temperature.

Which statements are correct?

- 1 Atoms of Y have more protons than atoms of X.
- 2 Molecules of Y have more atoms than molecules of X.
- 3 Y displaces X from aqueous solutions of X^- ions.

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

21 Copper is a widely used metal.

- 1 It does not react with water and so is used to make water pipes.
- 2 It has a low density and so is used in the manufacture of aircraft.
- 3 It is a good conductor of electricity and so is used in electrical wiring.

Which statements about copper are correct?

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

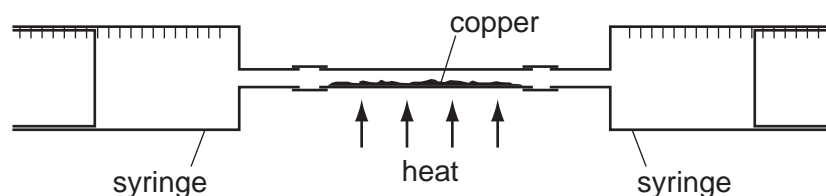
22 The element chromium liberates hydrogen from dilute hydrochloric acid. It does not react with cold water.

When a piece of chromium is placed in lead(II) nitrate solution, crystals of lead appear.

What is the order of **decreasing** reactivity of the metals?

- A** calcium → chromium → lead
B calcium → lead → chromium
C chromium → calcium → lead
D lead → chromium → calcium

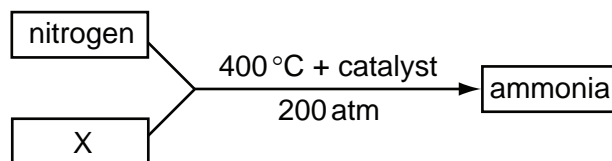
23 Using the apparatus shown, 100 cm³ of air are passed backwards and forwards between the two syringes until the reaction is complete.



What is the final volume of gas after cooling to the original temperature?

- A** 20 cm³ **B** 28 cm³ **C** 32 cm³ **D** 80 cm³

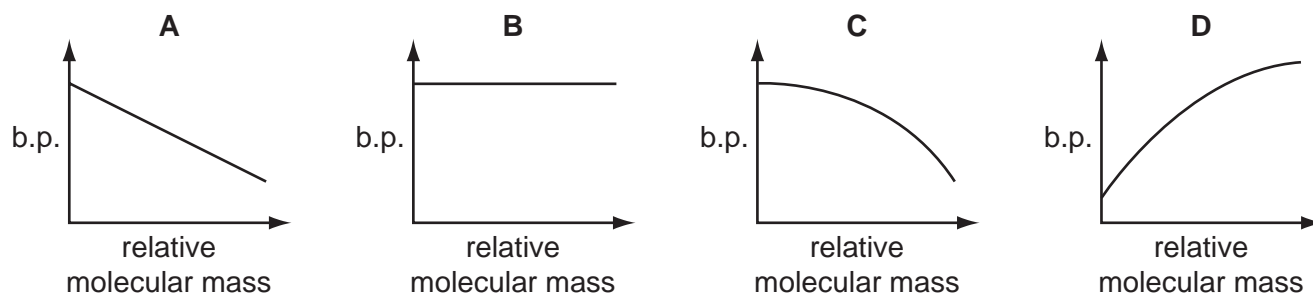
24 Nitrogen is used to produce ammonia as shown.



What is X?

- A hydrogen
- B iron
- C oxygen
- D water

25 Which graph represents the change in boiling point of the alkanes as their relative molecular mass increases?



26 Which can be used to distinguish between ethane and ethene?

- A a lighted splint
- B aqueous bromine
- C limewater
- D Universal Indicator

27 Substance X has the following uses.

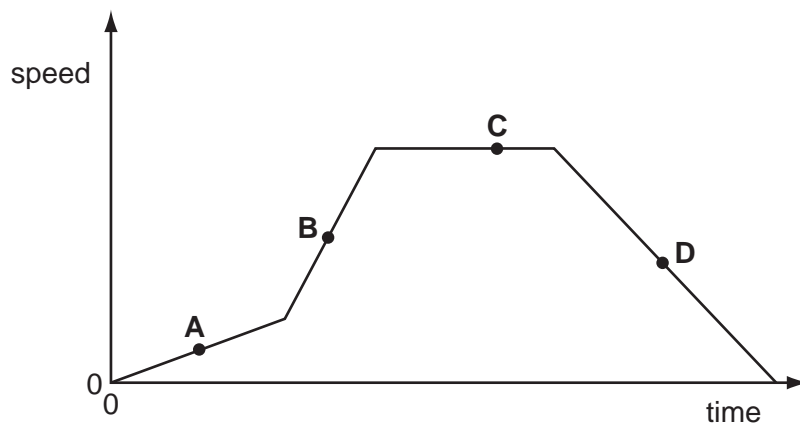
- 1 as a solvent used in paints and varnishes
- 2 as a liquid in thermometers
- 3 as a fuel used to power cars.

What is X?

- A butane
- B ethanol
- C ethanoic acid
- D octane

28 The speed-time graph shows the journey of a train.

At which point does the acceleration have its highest value?



29 What is the relationship between acceleration (a), force (F) and mass (m)?

- A $a = F \times m$ B $a = F + m$ C $a = F \div m$ D $a = m \div F$

30 A man has a mass of 60 kg on Earth. The Earth's gravitational field strength is 10 N/kg.

The Moon's gravitational field strength is 1.6 N/kg.

What is the man's weight on the Moon?

- A 60 kg B 60 N C 96 kg D 96 N

- 31 In a hydroelectric power station, water flows from a high reservoir to turn turbines to generate electricity.

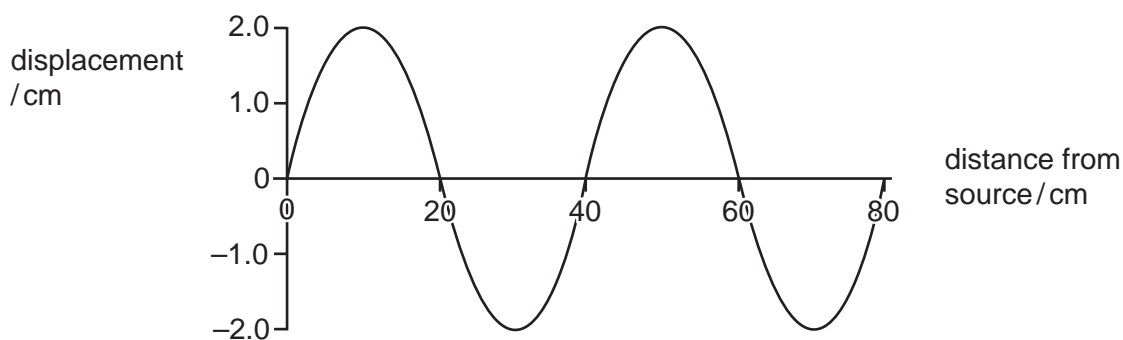
Which energy conversions take place?

- A gravitational potential \rightarrow chemical/fuel \rightarrow electrical
 - B gravitational potential \rightarrow kinetic \rightarrow electrical
 - C kinetic \rightarrow chemical/fuel \rightarrow electrical
 - D kinetic \rightarrow gravitational potential \rightarrow electrical
- 32 An electric motor lifts a weight of 8 N through a height of 5 m in 4 s.

What is the useful power developed?

- A 2.5 W
 - B 6.4 W
 - C 10 W
 - D 40 W
- 33 A clinical thermometer is placed in a person's mouth and then removed to read the temperature.
- Why is a clinical thermometer more suitable than a laboratory thermometer for this purpose?
- A It has a larger range.
 - B It has a linear scale.
 - C It has a steady reading.
 - D It has a wider bore.

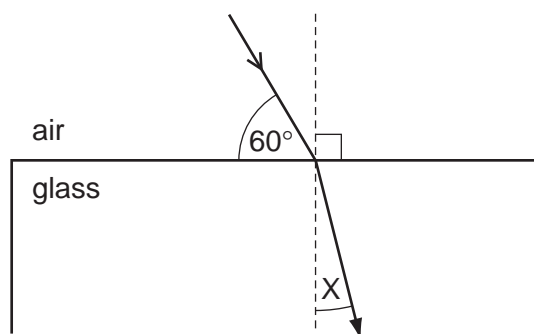
- 34 The diagram shows the variation of the displacement of a wave with distance from the source.



What is the amplitude of the wave?

- A 2.0 cm
- B 4.0 cm
- C 20 cm
- D 40 cm

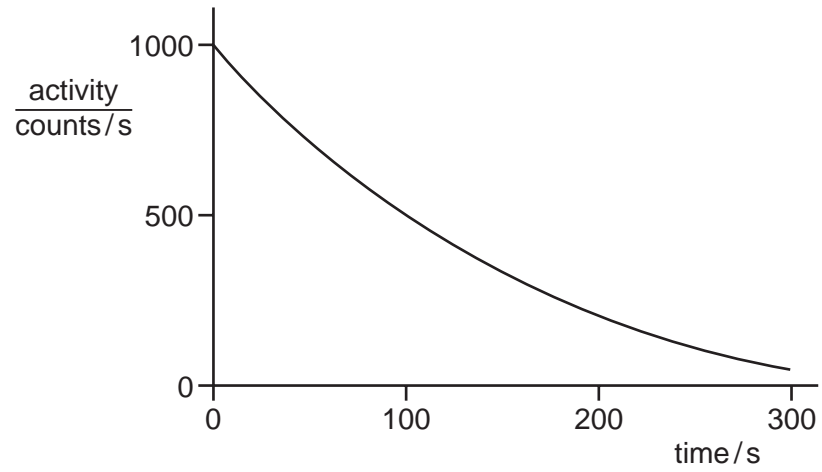
- 35 A ray of light passes into a glass block of refractive index 1.5.



What is the value of the angle marked X?

- A** 19.5° **B** 25.0° **C** 35.3° **D** 48.6°
- 36 A resistor in a circuit has a value of resistance of $3.0\ \Omega$.
In 20 s, a charge of 10 C passes through the resistor.
What is the potential difference across the resistor?
- A** 0.67 V **B** 1.5 V **C** 6.0 V **D** 30 V
- 37 A 2 kW electric heater is connected to a 240 V supply.
What is the current in the heater?
- A** 0.12 A **B** 8.3 A **C** 120 A **D** 480 A
- 38 Which properties make materials suitable for use as a core in an electromagnet?
- A** difficult to magnetise and easy to demagnetise
B difficult to magnetise and retains magnetic strength
C easy to magnetise and retains magnetic strength
D easy to magnetise and easy to demagnetise
- 39 What is reduced by a step-down transformer that is 100% efficient?
- A** current
B power
C resistance
D voltage

40 The graph shows how the activity of a radioactive material varies with time.



What is the half-life of this material?

- A** 100 s **B** 200 s **C** 300 s **D** 500 s

DATA SHEET
The Periodic Table of the Elements

		Group									
		I	II	III	IV	V	VI	VII	0		
		1 H Hydrogen 1									
7	9	3	4							2	
Li Lithium	Be Beryllium									He Helium	
23	24	11	12							20	
Na Sodium	Mg Magnesium									Ne Neon	
39	40	19	20							10	
K Potassium	Ca Calcium									F Fluorine	
85	88	37	38							9	
Rb Rubidium	Sr Strontium									O Oxygen	
133	137	55	56							8	
Cs Caesium	Ba Barium									N Nitrogen	
226	227	87	88							7	
Fr Francium	Ra Radium									C Carbon	
										6	
										14	
										Si Silicon	
										15	
										P Phosphorus	
										16	
										S Sulfur	
										17	
										Cl Chlorine	
										18	
										Ar Argon	
										36	
										Kr Krypton	
										54	
										Xe Xenon	
										86	
										Rn Radon	
										85	
										At Astatine	
										84	
										Po Polonium	
										83	
										Bi Bismuth	
										82	
										Pb Lead	
										81	
										Tl Thallium	
										80	
										Hg Mercury	
										79	
										Au Gold	
										78	
										Pt Platinum	
										77	
										Ir Iridium	
										76	
										Os Osmium	
										75	
										Re Rhenium	
										74	
										W Tungsten	
										73	
										Ta Tantalum	
										72	
										Hf Hafnium	
										71	
										Zr Zirconium	
										70	
										Ni Nickel	
										69	
										Cu Copper	
										68	
										Ag Silver	
										67	
										Pd Palladium	
										66	
										Cd Cadmium	
										65	
										Zn Zinc	
										64	
										Ga Gallium	
										63	
										Ge Germanium	
										62	
										As Arsenic	
										61	
										Se Selenium	
										60	
										Br Bromine	
										59	
										Kr Krypton	
										58	
										Ce Cerium	
										57	
										Pr Praseodymium	
										56	
										Nd Neodymium	
										55	
										Pm Promethium	
										54	
										Sm Samarium	
										53	
										Eu Europium	
										52	
										Gd Gadolinium	
										51	
										Tb Terbium	
										50	
										Dy Dysprosium	
										49	
										Ho Holmium	
										48	
										Er Erbium	
										47	
										Tm Thulium	
										46	
										Yb Ytterbium	
										45	
										Lu Lutetium	
										44	
										Hf Hafnium	
										43	
										Ta Tantalum	
										42	
										W Tungsten	
										41	
										Nb Niobium	
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