



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.

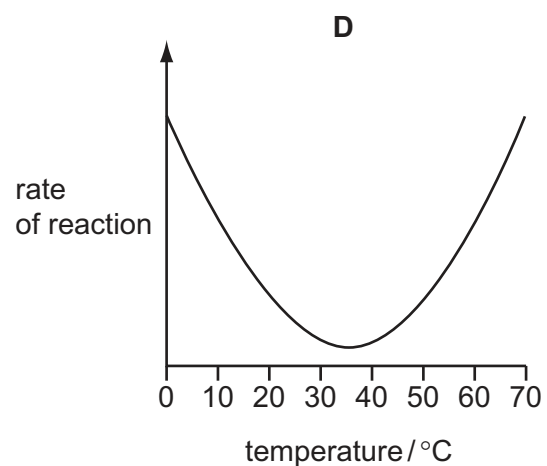
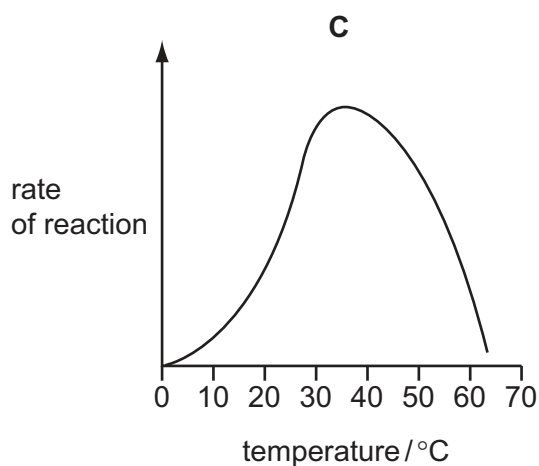
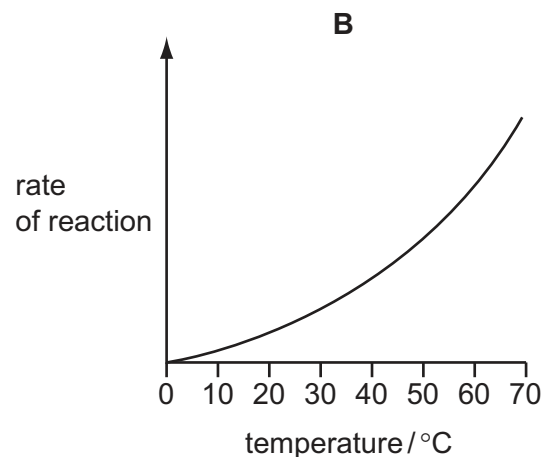
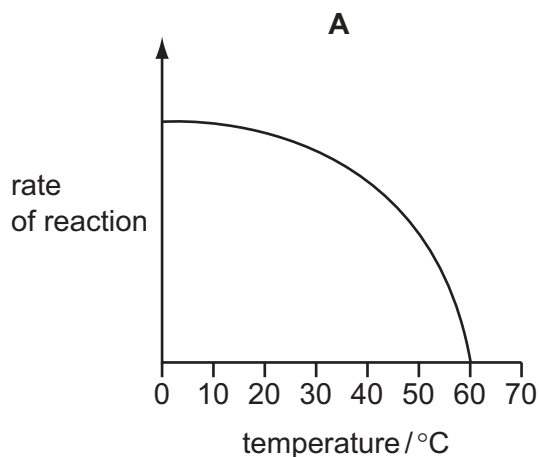
Which structure prevents the stain entering the living cells?

- 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.

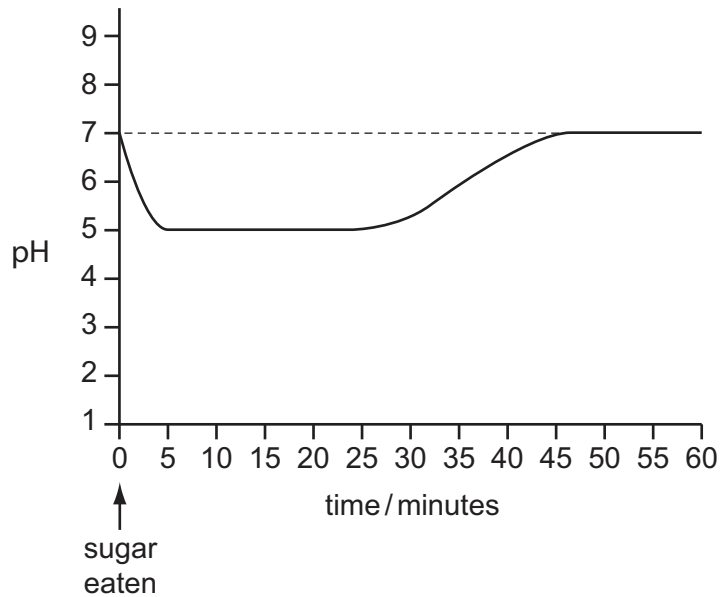
- 3 Which graph shows how the activity (rate of reaction) of an enzyme-catalysed reaction in the alimentary canal varies with temperature?



4 Where does most photosynthesis occur in a typical leaf?

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

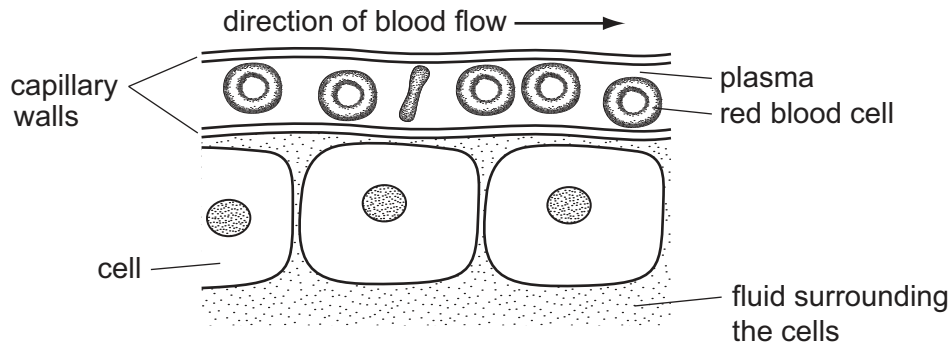
5 The graph shows changes to the pH of the saliva in the mouth after eating sugar.



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
<b>A</b>	glucose	glucose	diffusion
<b>B</b>	glucose	glucose	osmosis
<b>C</b>	starch	starch	absorption
<b>D</b>	starch	starch	osmosis

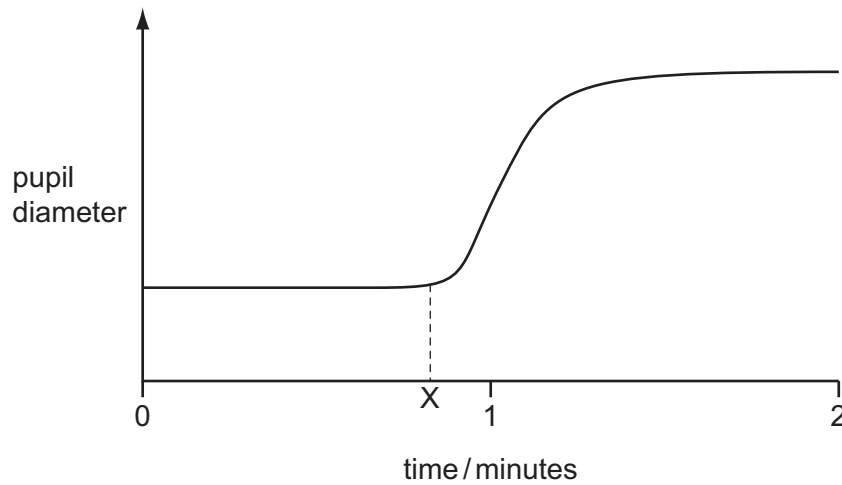
7 What is produced during anaerobic respiration in a muscle cell?

- 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
<b>A</b>	higher	higher
<b>B</b>	higher	lower
<b>C</b>	lower	higher
<b>D</b>	lower	lower

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

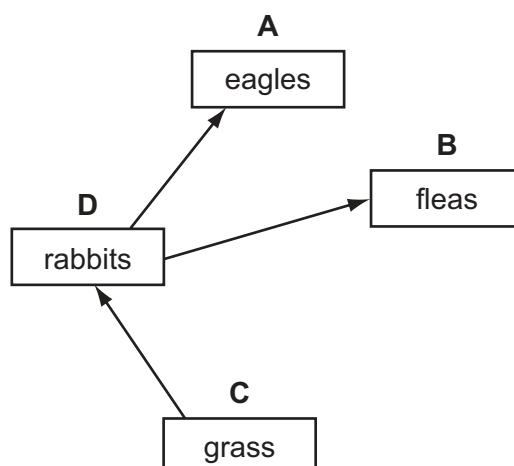


What happens to the light intensity and the pupil diameter immediately after time X?

	light intensity	pupil diameter
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	increases	decreases
<b>D</b>	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
<b>A</b>	left bare	allowed to decompose
<b>B</b>	left bare	to build furniture
<b>C</b>	to grow crops	allowed to decompose
<b>D</b>	to grow crops	to build furniture

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

	antibiotics	anti-viral drugs	condoms
<b>A</b>	✓	x	✓
<b>B</b>	✓	x	x
<b>C</b>	x	✓	✓
<b>D</b>	x	✓	x

key

✓ = used

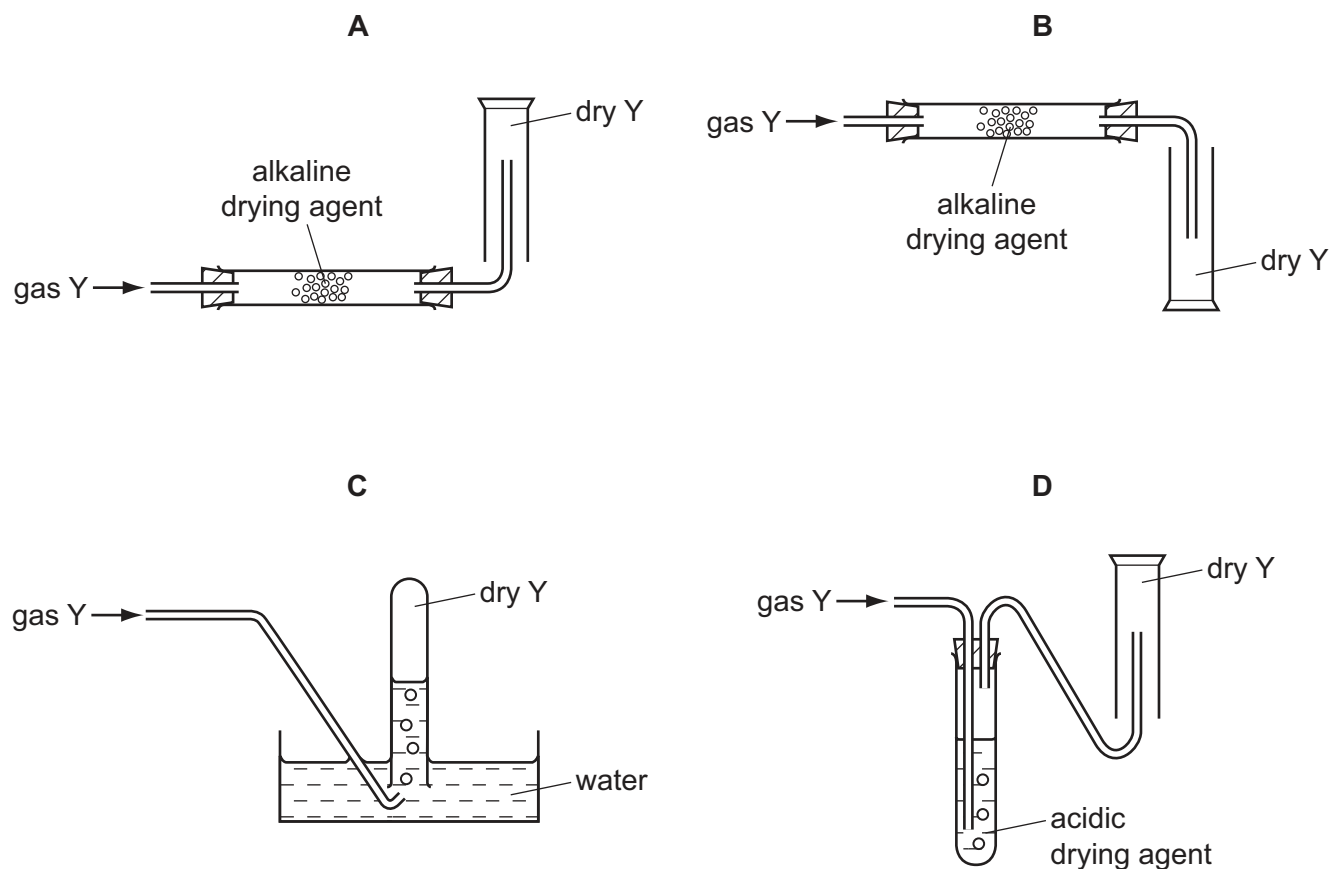
x = not used

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,  ${}^{35}_{17}\text{Cl}$  and  ${}^{37}_{17}\text{Cl}$ .

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  $\text{MgBr}_2$ .

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
<b>A</b>	-85	none	soluble
<b>B</b>	-62	none	insoluble
<b>C</b>	1413	good	soluble
<b>D</b>	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

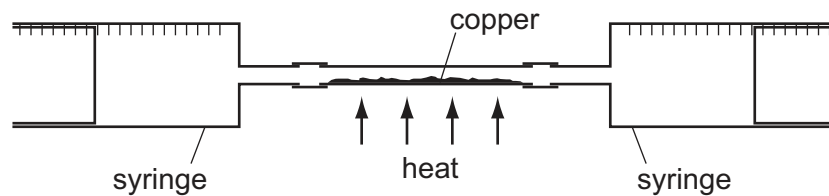
22 The element chromium liberates hydrogen from dilute hydrochloric acid. It does not react with cold water.

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

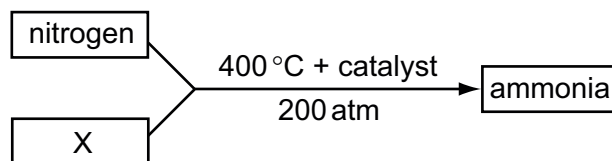
23 Using the apparatus shown, 100 cm<sup>3</sup> of air are passed backwards and forwards between the two syringes until the reaction is complete.



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

- A** 20 cm<sup>3</sup>      **B** 28 cm<sup>3</sup>      **C** 32 cm<sup>3</sup>      **D** 80 cm<sup>3</sup>

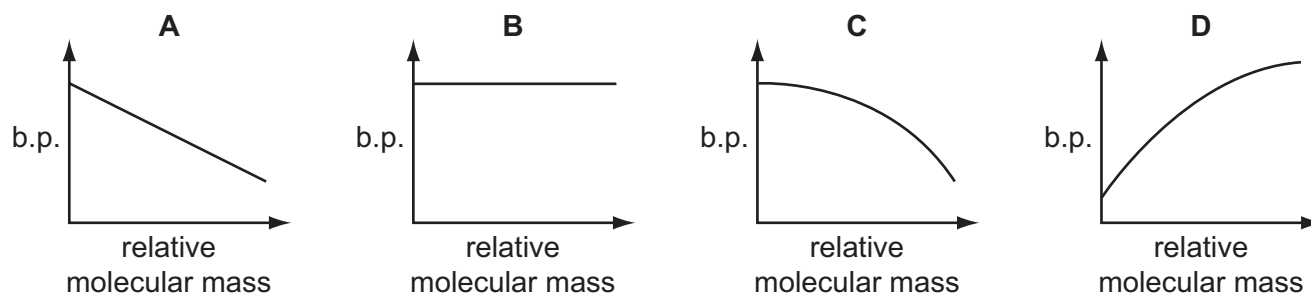
24 Nitrogen is used to produce ammonia as shown.



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.

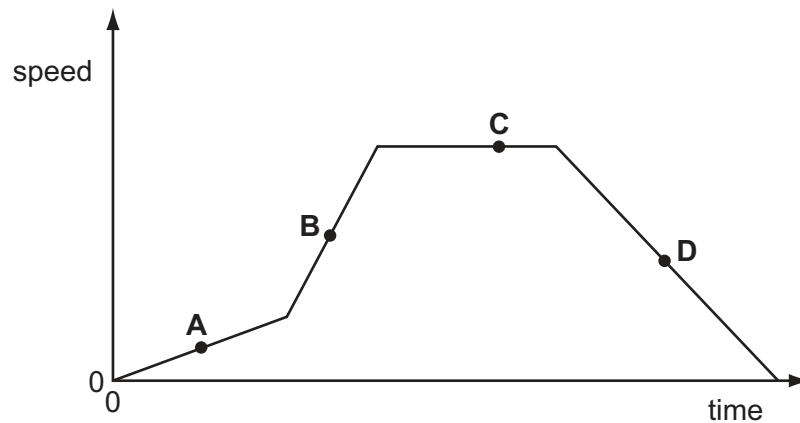
- 1 as a solvent used in paints and varnishes
- 2 as a liquid in thermometers
- 3 as a fuel used to power cars.

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?

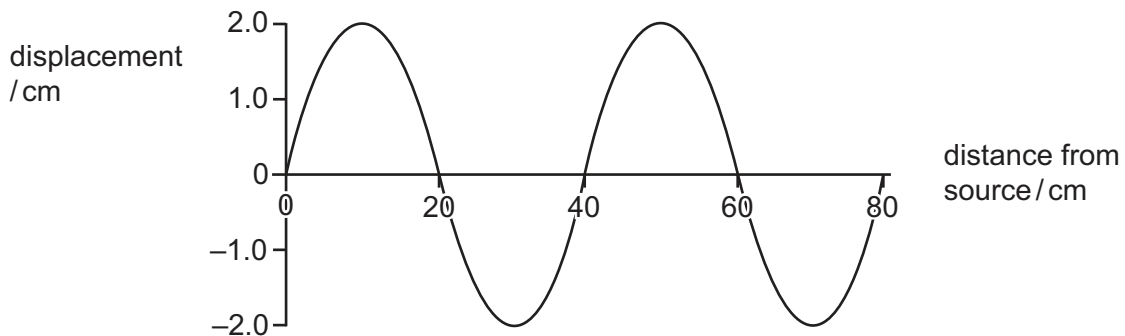
- A 2.5 W
- B 6.4 W
- C 10 W
- D 40 W

- 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.

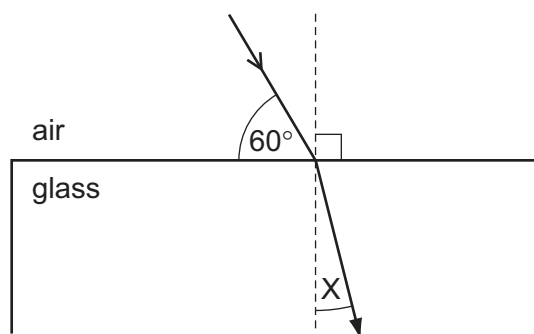
- 34 The diagram shows the variation of the displacement of a wave with distance from the source.



What is the amplitude of the wave?

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

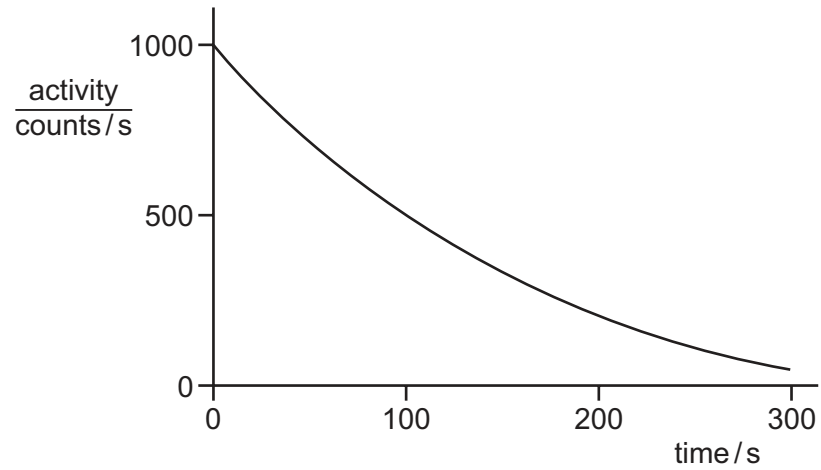
- 35 A ray of light passes into a glass block of refractive index 1.5.



What is the value of the angle marked X?

- A**  $19.5^\circ$       **B**  $25.0^\circ$       **C**  $35.3^\circ$       **D**  $48.6^\circ$
- 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 <b>H</b> Hydrogen 1											2 <b>He</b> Helium 2																	
3 <b>Li</b> Lithium 4	9 <b>Be</b> Beryllium 4											5 <b>B</b> Boron 5	11 <b>B</b> Boron 5	12 <b>C</b> Carbon 6	14 <b>N</b> Nitrogen 7	16 <b>O</b> Oxygen 8	19 <b>F</b> Fluorine 9	20 <b>Ne</b> Neon 10										
11 <b>Na</b> Sodium 11	23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12											13 <b>Al</b> Aluminium 13	27 <b>Al</b> Aluminium 13	28 <b>Si</b> Silicon 14	31 <b>P</b> Phosphorus 15	32 <b>S</b> Sulfur 16	35.5 <b>Cl</b> Chlorine 17	40 <b>Ar</b> Argon 18									
19 <b>K</b> Potassium 19	39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20	45 <b>Sc</b> Scandium 21	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	59 <b>Co</b> Cobalt 27	64 <b>Cu</b> Copper 29	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	84 <b>Kr</b> Krypton 36											
37 <b>Rb</b> Rubidium 37	85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38	89 <b>Y</b> Yttrium 39	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	128 <b>Te</b> Tellurium 52	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54												
55 <b>Cs</b> Caesium 55	133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83	210 <b>Po</b> Polonium 84	210 <b>At</b> Astatine 85	210 <b>Rn</b> Radon 86												
87 <b>Fr</b> Francium 87	226 <b>Ra</b> Radium 88	227 <b>Ac</b> Actinium 89											81 <b>Th</b> Thorium 90	82 <b>Pa</b> Protactinium 91	83 <b>U</b> Uranium 92	84 <b>Np</b> Neptunium 93	85 <b>Pu</b> Plutonium 94	86 <b>Am</b> Americium 95	87 <b>Cm</b> Curium 96	88 <b>Bk</b> Berkelium 97	89 <b>Cf</b> Californium 98	90 <b>Es</b> Einsteinium 99	91 <b>Fm</b> Fermium 100	92 <b>Md</b> Mendelevium 101	93 <b>No</b> Nobelium 102	94 <b>Lr</b> Lawrencium 103		
		*58-71 Lanthanoid series		†90-103 Actinoid series												140 <b>Ce</b> Cerium 58	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	146 <b>Pm</b> Promethium 61	150 <b>Sm</b> Samarium 62	152 <b>Eu</b> Europium 63	157 <b>Gd</b> Gadolinium 64	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	169 <b>Tm</b> Thulium 69	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71

a = relative atomic mass

X = atomic symbol

b = proton (atomic) number

Key

a

X

b

The volume of one mole of any gas is 24 dm<sup>3</sup> at room temperature and pressure (r.t.p.).

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