



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
General Certificate of Education Ordinary Level

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**COMBINED SCIENCE**

**5129/01**

Paper 1 Multiple Choice

**October/November 2009**

**1 hour**

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

\* 6 3 9 5 8 3 5 7 3 4 \*

**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.

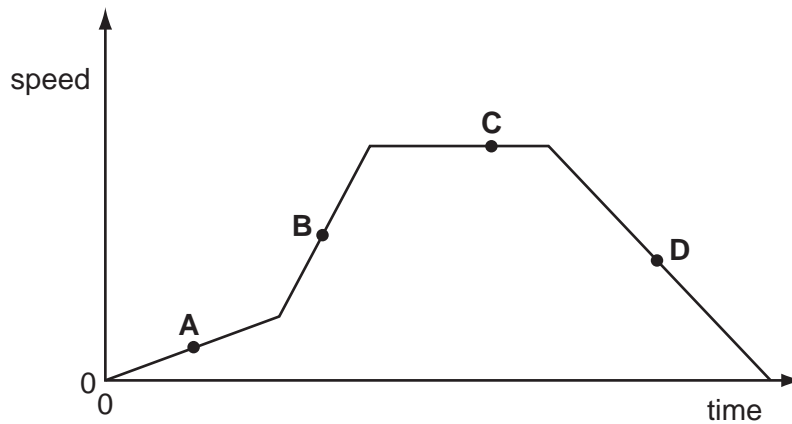
A copy of the Periodic Table is printed on page 16.

This document consists of **13** printed pages and **3** blank pages.



- 1 What gives the most accurate value for the internal diameter of a test tube?
- A a measuring tape  
B a metre rule  
C a micrometer screw gauge  
D vernier calipers
- 2 The speed-time graph shows the journey of a train.

At which point does the acceleration have its highest value?



- 3 If a nut and bolt are difficult to undo, it may be easier to turn the nut by using a longer spanner.
- This is because the longer spanner gives
- A a larger turning moment.  
B a smaller turning moment.  
C less friction.  
D more friction.
- 4 A crane lifts a concrete block, whose weight is 60 000 N, to a height of 20 m in 30 s.
- What power is achieved by the crane?
- A 100 W      B 4000 W      C 40 000 W      D 90 000 W

- 5 The volume of a fixed mass of liquid can be used to measure temperature.

Why is this?

- A It can be coloured.
- B It expands when it is heated.
- C It is a poor conductor of heat.
- D It is cheap.

- 6 The frequency of a certain v.h.f. radio transmitter is  $2 \times 10^8$  Hz.

The speed of the waves is  $3 \times 10^8$  m/s.

What is the wavelength?

- A 0.67 m      B 1.0 m      C 1.5 m      D 6.0 m

- 7 A ray of light travels from air into glass. The refractive index of the glass is 1.5.

Which of the following pairs could be values of the angle of incidence and the angle of refraction?

	angle of incidence	angle of refraction
A	21.5°	20.0°
B	40.0°	30.0°
C	60.0°	35.3°
D	80.0°	53.3°

- 8 An electrical quantity is defined as 'the energy dissipated by a source in driving unit charge round a complete circuit.'

What is this quantity called?

- A current
- B electromotive force
- C potential difference
- D power

- 9 A set of lights consists of 40 identical lamps connected in series to a 240 V mains supply.

What is the potential difference across each lamp?

- A 6 V      B 40 V      C 240 V      D 9600 V

- 10 An electric kettle is plugged in and switched on. The fuse in the plug blows immediately.
- Which single fault could cause this?
- A The earth wire is not connected to the kettle.
  - B The live wire and neutral wire connections in the plug are swapped around.
  - C The live wire touches the metal case of the kettle.
  - D The wires connected to the plug are too thin.

- 11 Which statement about the action of a transformer is correct?
- A An e.m.f. is induced in the secondary coil when an alternating voltage is applied to the primary coil.
  - B An e.m.f. is induced in the secondary coil when there is a steady direct current in the primary coil.
  - C The current in the secondary coil is always larger than the current in the primary coil.
  - D The voltage in the secondary coil is always larger than the voltage in the primary coil.

- 12 Two nuclides of neon are represented by the symbols below.

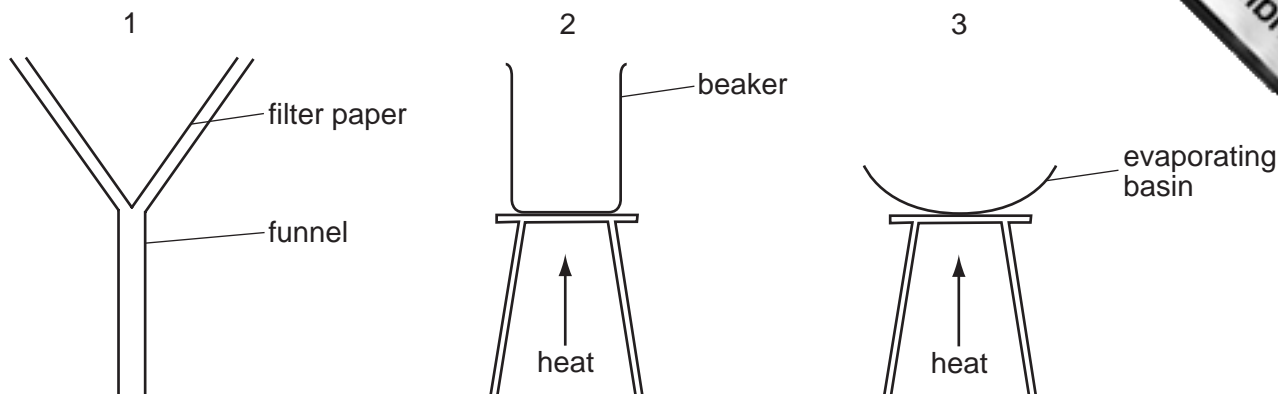


One nuclide contains more particles than the other.

What are these extra particles?

- A electrons
  - B ions
  - C neutrons
  - D protons
- 13 The half-life of a radioactive material is 24 years.
- The activity of a sample falls to a fraction of its initial value after 72 years.
- What is the fraction?
- A  $\frac{1}{3}$
  - B  $\frac{1}{4}$
  - C  $\frac{1}{6}$
  - D  $\frac{1}{8}$

14 The diagrams show three sets of apparatus.



What apparatus would be used to obtain separate samples of sand and salt from a mixture of sand and seawater?

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

15 The symbol for an atom of potassium is  ${}^{39}_{19}\text{K}$ .

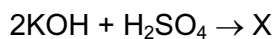
What does the number 39 represent for an atom of potassium?

- A** the number of nucleons  
**B** the number of protons  
**C** its position in the Periodic Table  
**D** the number of electrons plus protons plus neutrons

16 Which pair of elements form a compound by sharing electrons?

- A** carbon and chlorine  
**B** lithium and iodine  
**C** neon and oxygen  
**D** potassium and bromine

17 The following equation is incomplete.



What is represented by X?

- A**  $\text{KSO}_4 + \text{H}_2\text{O}$   
**B**  $\text{K}_2\text{SO}_4 + \text{H}_2\text{O}$   
**C**  $\text{KSO}_4 + 2\text{H}_2\text{O}$   
**D**  $\text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$

18 Which reactants could be used safely to prepare potassium chloride?

- A aqueous potassium hydroxide and dilute hydrochloric acid
- B aqueous potassium sulfate and aqueous sodium chloride
- C potassium and aqueous sodium chloride
- D potassium and dilute hydrochloric acid

19 Caesium is in the same group of the Periodic Table as sodium and potassium.

What is a property of caesium?

- A It does not conduct electricity.
- B It forms an acidic oxide.
- C It forms an ionic chloride,  $\text{CsCl}_2$ .
- D It reacts with water, forming hydrogen.

20 Which row in the table gives a correct use for the metal stated?

	metal	use
A	aluminium	manufacture of aircraft
B	copper	galvanising dustbins
C	mild steel	cutlery
D	zinc	cooking utensils

21 Nickel is placed between zinc and iron in the reactivity series.

Which metal reduces the oxide of nickel?

- A copper
- B iron
- C lead
- D magnesium

22 Which shows both the correct source and the correct effect of the named pollutant?

	pollutant	source	effect
<b>A</b>	carbon monoxide	incomplete combustion of carbon-containing materials	global warming
<b>B</b>	oxides of nitrogen	decaying vegetable matter	global warming
<b>C</b>	ozone	photochemical reactions	acid rain
<b>D</b>	sulfur dioxide	volcanoes	acid rain

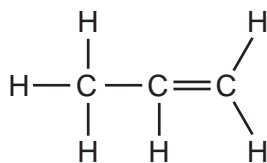
23 Which compound provides two elements essential to plant growth?

- A** potassium chloride
- B** potassium nitrate
- C** sodium phosphate
- D** sodium sulfate

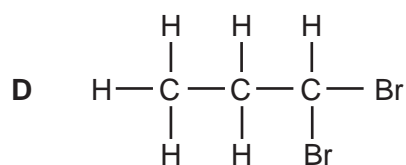
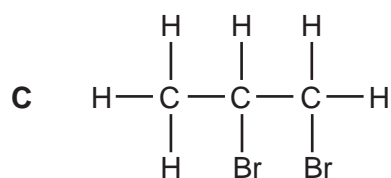
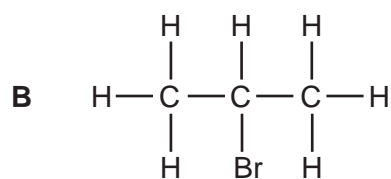
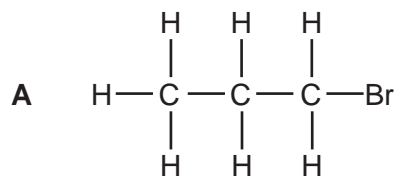
24 Methane is the main constituent of

- A** diesel.
- B** naphtha.
- C** natural gas.
- D** petrol.

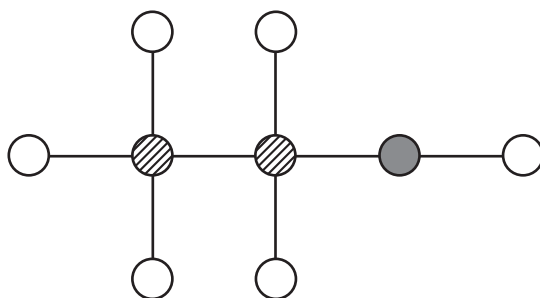
25 Propene is an unsaturated hydrocarbon. Its structure is shown.



What is produced when propene reacts with bromine?



26 The diagram represents an organic compound that contains three different elements.



What could the compound be?

- A** ethanoic acid
- B** ethanol
- C** propane
- D** propene



27 Which statement about a compound means that it **must** be an alkane?

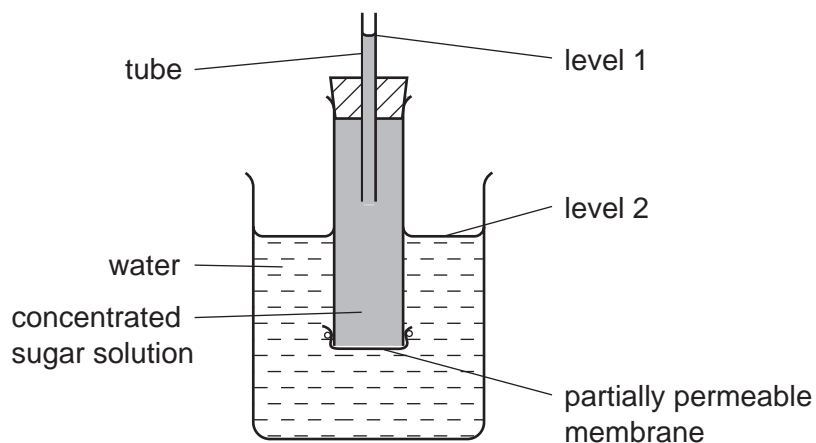
- A It burns easily in air or in oxygen.
- B It contains carbon and hydrogen only.
- C It has the general formula  $C_nH_{2n+2}$ .
- D It is generally unreactive.

28 The table shows some characteristics of four types of cell.

Which cell could be a root hair cell?

	nucleus	chloroplast	
<b>A</b>	✓	✓	key ✓ = present x = absent
<b>B</b>	✓	x	
<b>C</b>	x	✓	
<b>D</b>	x	x	

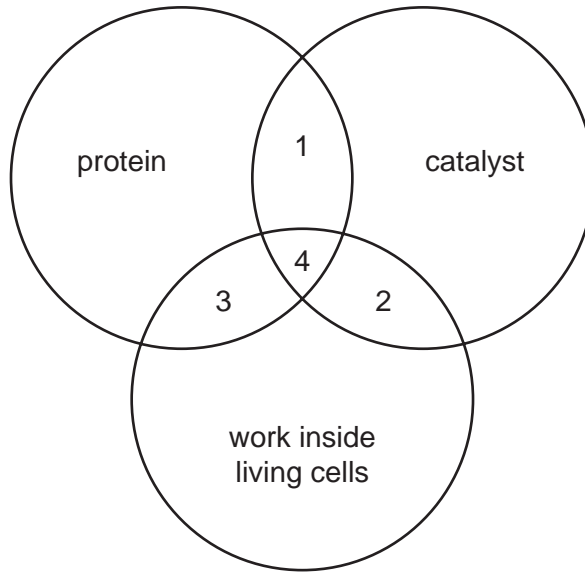
29 The diagram shows apparatus used to investigate osmosis.



Which molecules will move across the partially permeable membrane and which changes in levels will occur?

	molecules	level 1	level 2
<b>A</b>	sugar	fall	rise
<b>B</b>	water	fall	rise
<b>C</b>	sugar	rise	fall
<b>D</b>	water	rise	fall

30 The diagram shows three properties of substances in living organisms.



Which numbered areas represent **most** enzymes?

- A** 1 and 2      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

31 Some organisms live in the dark at the bottom of the seas and, to synthesise glucose, use energy from chemicals in the very hot water that comes out of volcanoes.

What is a distinguishing feature of these organisms?

- A** Their enzymes are easily denatured by heat.  
**B** They do not need carbon dioxide.  
**C** They do not need to be green.  
**D** They obtain energy only as carnivores.

32 What is the function of the gall bladder?

- A** absorption of fat  
**B** digestion of fat  
**C** production of bile  
**D** storage of bile

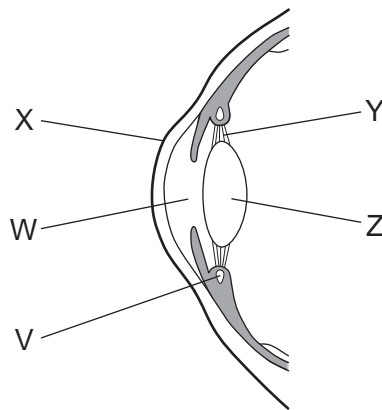
33 What is the correct route for blood flow in a human?

- A** left atrium → left ventricle → lungs → right ventricle → right atrium  
**B** left atrium → left ventricle → right ventricle → right atrium → lungs  
**C** right atrium → right ventricle → left ventricle → left atrium → lungs  
**D** right atrium → right ventricle → lungs → left atrium → left ventricle

34 What happens during vigorous exercise?

	rate of breathing	depth of each breath
<b>A</b>	decreases	decreases
<b>B</b>	decreases	increases
<b>C</b>	increases	decreases
<b>D</b>	increases	increases

35 The diagram shows a section of a human eye focused on a near object.



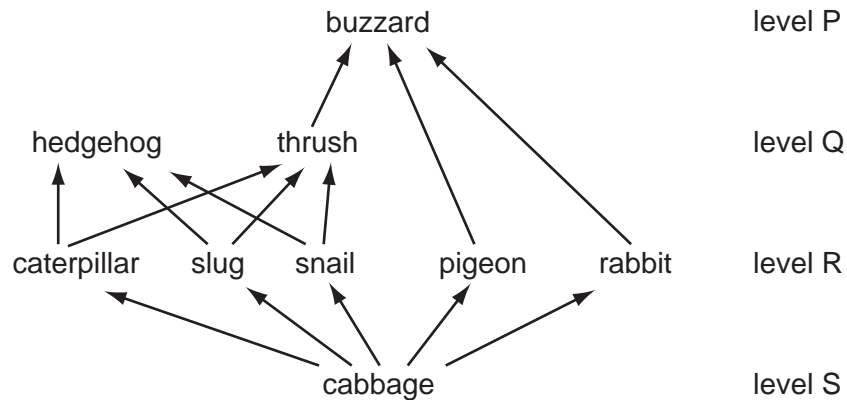
Which parts will change to focus on a distant object?

- A** W, X and Y
  - B** V, X and Z
  - C** W, Y and Z
  - D** V, Y and Z
- 36 Which organ may be damaged as it breaks down alcohol?
- A** brain
  - B** kidney
  - C** liver
  - D** stomach

37 Which is a possible sequence for energy flowing through a food web?

	lost as heat	present in glucose	present in protein	recycled for photosynthesis
<b>A</b>	–	2	1	3
<b>B</b>	1	–	3	2
<b>C</b>	2	3	–	1
<b>D</b>	3	1	2	–

38 The diagram shows a food web.



Which levels represent carnivores?

- A** P and Q      **B** P and R      **C** Q and R      **D** R and S

39 In addition to water, what is essential for the germination of a seed?

- A** carbon dioxide and light  
**B** oxygen and a suitable temperature  
**C** oxygen and soil  
**D** soil and a suitable temperature

40 What substances are present in breast milk but not in bottled milk?

- A** antibodies  
**B** carbohydrates  
**C** minerals  
**D** vitamins







**DATA SHEET**  
**The Periodic Table of the Elements**

		Group																		
I	II	III	IV	V	VI	VII	0													
		1 <b>H</b> Hydrogen 1										4 <b>He</b> Helium 2								
7 <b>Li</b> Lithium 3	9 <b>Be</b> Beryllium 4							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							
23 <b>Na</b> Sodium 11	24 <b>Mg</b> Magnesium 12							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							
39 <b>K</b> Potassium 19	40 <b>Ca</b> Calcium 20							70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	79 <b>Se</b> Selenium 34	80 <b>Br</b> Bromine 35	84 <b>Kr</b> Krypton 36							
85 <b>Rb</b> Rubidium 37	88 <b>Sr</b> Strontium 38							65 <b>Zn</b> Zinc 30	64 <b>Cu</b> Copper 29	59 <b>Ni</b> Nickel 28	59 <b>Co</b> Cobalt 27	106 <b>Pd</b> Palladium 46	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium 49	119 <b>Sn</b> Tin 50	122 <b>Sb</b> Antimony 51	127 <b>I</b> Iodine 53	131 <b>Xe</b> Xenon 54		
133 <b>Cs</b> Caesium 55	137 <b>Ba</b> Barium 56							101 <b>Ru</b> Ruthenium 44	106 <b>Pd</b> Palladium 46	103 <b>Rh</b> Rhodium 45	103 <b>Rh</b> Rhodium 45	192 <b>Ir</b> Iridium 77	201 <b>Hg</b> Mercury 80	204 <b>Tl</b> Thallium 81	207 <b>Pb</b> Lead 82	209 <b>Bi</b> Bismuth 83			227 <b>Ac</b> Actinium 89	
	226 <b>Ra</b> Radium 88							56 <b>Fe</b> Iron 26	59 <b>Co</b> Cobalt 27	55 <b>Mn</b> Manganese 25	56 <b>Fe</b> Iron 26	78 <b>Pt</b> Platinum 78	190 <b>Os</b> Osmium 76	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80				
								51 <b>V</b> Vanadium 23	48 <b>Ti</b> Titanium 22	51 <b>V</b> Vanadium 23	52 <b>Cr</b> Chromium 24	77 <b>Ir</b> Iridium 77	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80				
								93 <b>Nb</b> Niobium 41	91 <b>Zr</b> Zirconium 40	93 <b>Nb</b> Niobium 41	96 <b>Mo</b> Molybdenum 42	181 <b>Ta</b> Tantalum 73	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80				
								181 <b>Ta</b> Tantalum 73	178 <b>Hf</b> Hafnium 72	181 <b>Ta</b> Tantalum 73	184 <b>W</b> Tungsten 74	181 <b>Ta</b> Tantalum 73	192 <b>Ir</b> Iridium 77	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold 79	201 <b>Hg</b> Mercury 80				
								144 <b>Nd</b> Neodymium 60	141 <b>Pr</b> Praseodymium 59	144 <b>Nd</b> Neodymium 60	141 <b>Pr</b> Praseodymium 59	150 <b>Sm</b> Samarium 62	159 <b>Tb</b> Terbium 65	162 <b>Dy</b> Dysprosium 66	165 <b>Ho</b> Holmium 67	167 <b>Er</b> Erbium 68	173 <b>Yb</b> Ytterbium 70	175 <b>Lu</b> Lutetium 71		
								238 <b>U</b> Uranium 92	232 <b>Th</b> Thorium 90	238 <b>U</b> Uranium 92	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	238 <b>U</b> Uranium 92	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90	232 <b>Th</b> Thorium 90
								94 <b>Pu</b> Plutonium 94	96 <b>Cm</b> Curium 96	94 <b>Pu</b> Plutonium 94	96 <b>Cm</b> Curium 96	96 <b>Cm</b> Curium 96	97 <b>Bk</b> Berkelium 97	98 <b>Cf</b> Californium 98	99 <b>Es</b> Einsteinium 99	100 <b>Fm</b> Fermium 100	102 <b>No</b> Nobelium 102	103 <b>Lr</b> Lawrencium 103		

\*58-71 Lanthanoid series  
†90-103 Actinoid series

Key  

a	<b>X</b>
b	

 a = relative atomic mass  
 X = atomic symbol  
 b = proton (atomic) number

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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