



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

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)



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.

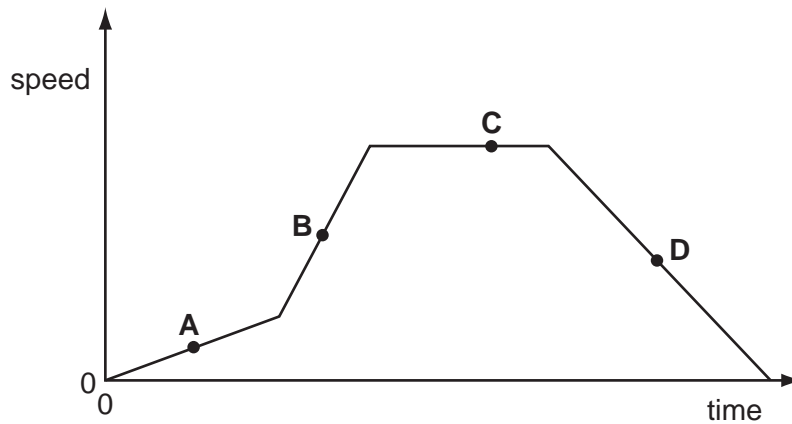


1 What gives the most accurate value for the internal diameter of a test tube?

- 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 2×10^8 Hz.

The speed of the waves is 3×10^8 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

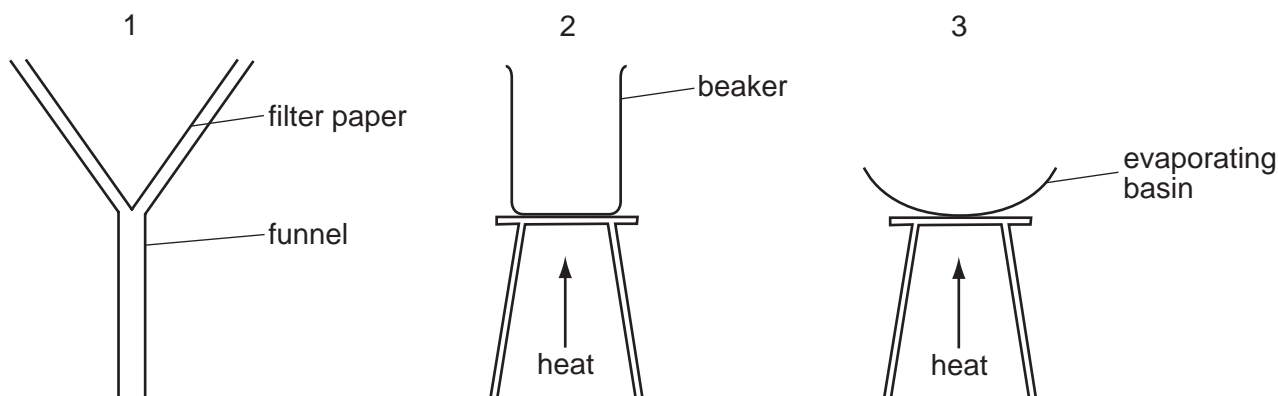
13 The half-life of a radioactive material is 24 years.

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 ${}^{39}_{19}\text{K}$.

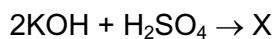
What does the number 39 represent for an atom of potassium?

- 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, 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
A	carbon monoxide	incomplete combustion of carbon-containing materials	global warming
B	oxides of nitrogen	decaying vegetable matter	global warming
C	ozone	photochemical reactions	acid rain
D	sulfur dioxide	volcanoes	acid rain

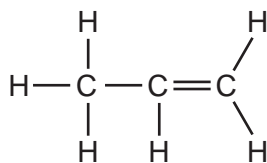
23 Which compound provides two elements essential to plant growth?

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

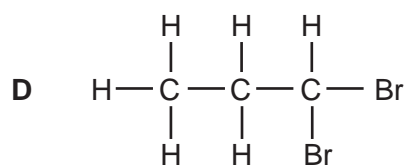
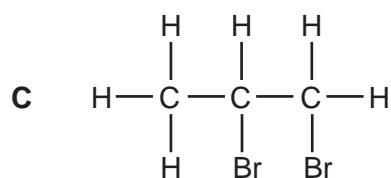
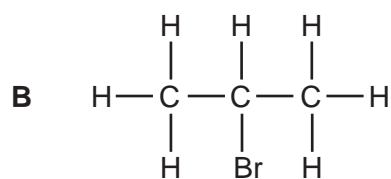
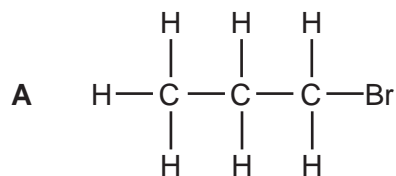
24 Methane is the main constituent of

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

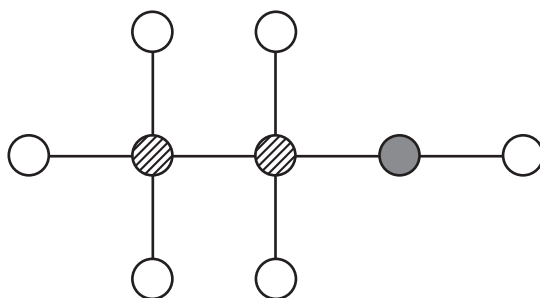
25 Propene is an unsaturated hydrocarbon. Its structure is shown.



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?

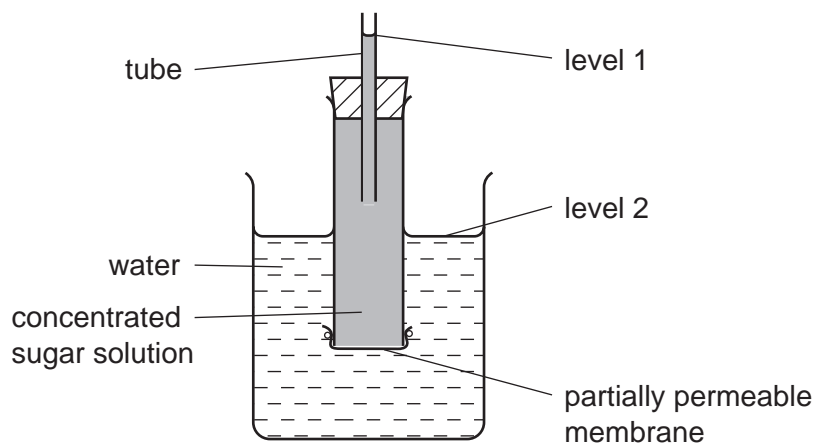
- A It burns easily in air or in oxygen.
- B It contains carbon and hydrogen only.
- C It has the general formula C_nH_{2n+2} .
- D It is generally unreactive.

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

Which cell could be a root hair cell?

	nucleus	chloroplast	
A	✓	✓	key ✓ = present x = absent
B	✓	x	
C	x	✓	
D	x	x	

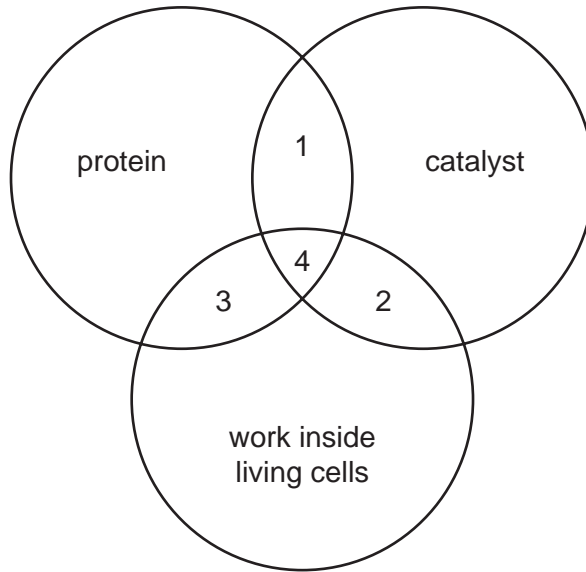
29 The diagram shows apparatus used to investigate osmosis.



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

	molecules	level 1	level 2
A	sugar	fall	rise
B	water	fall	rise
C	sugar	rise	fall
D	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

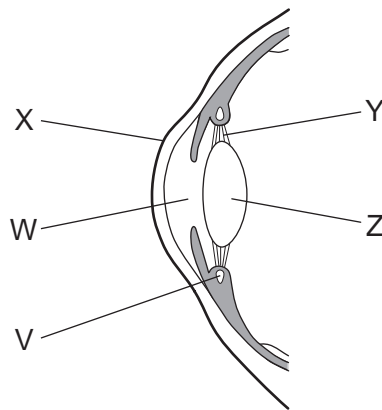
33 What is the correct route for blood flow in a human?

- 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
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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



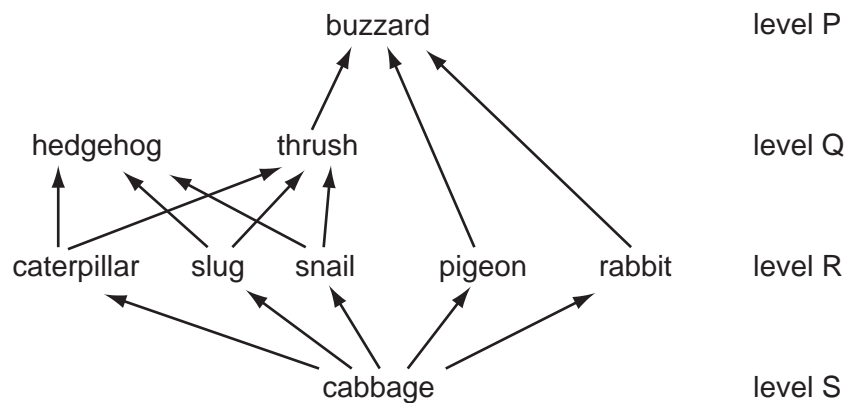
Which parts will change to focus on a distant object?

- 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
A	–	2	1	3
B	1	–	3	2
C	2	3	–	1
D	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	O																																																																																							
7 Li Lithium 3	9 Be Beryllium 4	1 H Hydrogen 1	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	23 Na Sodium 11	24 Mg Magnesium 12	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18	39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	106 Pd Palladium 46	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	127 I Iodine 53	131 Xe Xenon 54	133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	210 Rn Radon 86	226 Ra Radium 88	227 Ac Actinium 89	232 Th Thorium 90	232 Pa Protactinium 91	238 U Uranium 92	238 Np Neptunium 93	238 Pu Plutonium 94	238 Am Americium 95	238 Cm Curium 96	238 Bk Berkelium 97	238 Cf Californium 98	238 Es Einsteinium 99	238 Fm Fermium 100	238 Md Mendelevium 101	238 No Nobelium 102	238 Lr Lawrencium 103	140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71

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

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20px;">a</td> <td style="text-align: center; width: 20px;">X</td> <td style="text-align: center; width: 20px;">b</td> </tr> </table>	a	X	b	a = relative atomic mass X = atomic symbol b = proton (atomic) number
a	X	b		

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).

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