

COMBINED SCIENCE

Paper 1 Multiple Choice

5129/01 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.

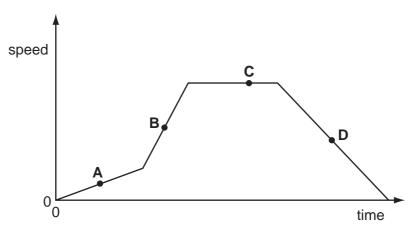
This document consists of 13 printed pages and 3 blank pages.



[Turn over

- 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?

Α	100 W	В	4000 W	С	40 000 W	D	90 000 W
---	-------	---	--------	---	----------	---	----------

5129/01/O/N/09

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 \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
Α	21.5°	20.0°
В	40.0°	30.0°
С	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?

Α	6 V	В	40 V	С	240 V	D	9600 V
---	-----	---	------	---	-------	---	--------

5129/01/O/N/09

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.

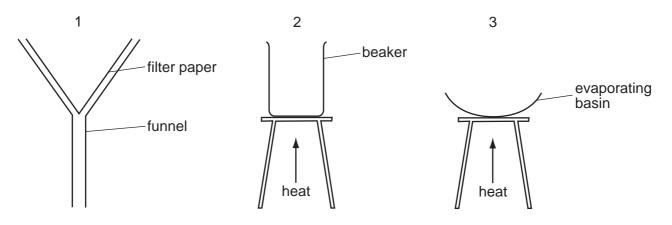
The activity of a sample falls to a fraction of its initial value after 72 years.

What is the fraction?

Α	<u>1</u>	в <u>1</u>	c <u>1</u>	П	<u>1</u>
~	3	4	6	D	8

5129/01/O/N/09

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 ${}^{39}_{19}$ 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.

$$2KOH + H_2SO_4 \rightarrow X$$

What is represented by X?

- **A** KSO₄ + H₂O
- **B** K₂SO₄ + H₂O
- **C** KSO₄ + 2H₂O
- $\textbf{D} \quad K_2 SO_4 + 2 H_2 O$

5129/01/O/N/09

[Turn over

- 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
Α	aluminium	manufacture of aircraft
В	copper	galvanising dustbins
С	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

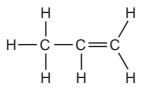
5129/01/O/N/09

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

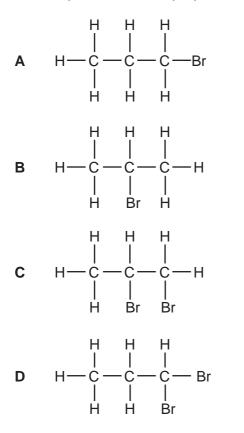
	pollutant	source	effect
Α	carbon monoxide	incomplete combustion of carbon-containing materials	global warming
В	oxides of nitrogen	decaying vegetable matter	global warming
С	ozone	photochemical reactions	acid rain
D	sulfur dioxide	volcanoes	acid rain

- 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.

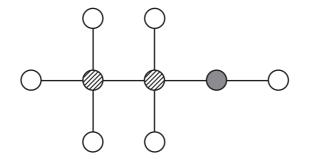
25 Propene is an unsaturated hydrocarbon. Its structure is shown.



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

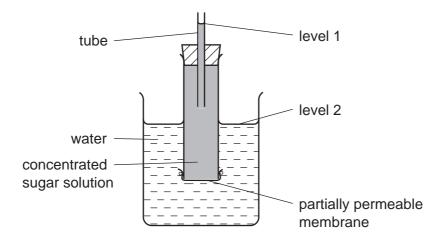
5129/01/O/N/09

- 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	
Α	\checkmark	\checkmark	key
в	\checkmark	×	✓ = present
С	×	\checkmark	x = absent
D	×	x	

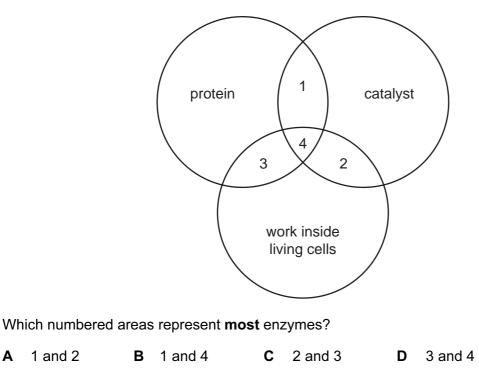
29 The diagram shows apparatus used to investigate osmosis.



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

	molecules	level 1	level 2
Α	sugar	fall	rise
в	water	fall	rise
С	sugar	rise	fall
D	water	rise	fall

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



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?

- Α Their enzymes are easily denatured by heat.
- В They do not need carbon dioxide.
- С They do not need to be green.
- D They obtain energy only as carnivores.
- 32 What is the function of the gall bladder?
 - absorption of fat Α

Α

1 and 2

- В digestion of fat
- С production of bile
- D storage of bile

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

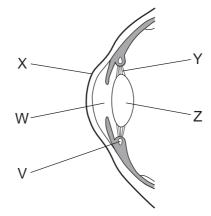
- Α left atrium \rightarrow left ventricle \rightarrow lungs \rightarrow right ventricle \rightarrow right atrium
- В left atrium \rightarrow left ventricle \rightarrow right ventricle \rightarrow right atrium \rightarrow lungs
- С right atrium \rightarrow right ventricle \rightarrow left ventricle \rightarrow left atrium \rightarrow lungs
- D right atrium \rightarrow right ventricle \rightarrow lungs \rightarrow left atrium \rightarrow left ventricle

5129/01/O/N/09

34 What happens during vigorous exercise?

	rate of breathing	depth of each breath
Α	decreases	decreases
В	decreases	increases
С	increases	decreases
D	increases	increases

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



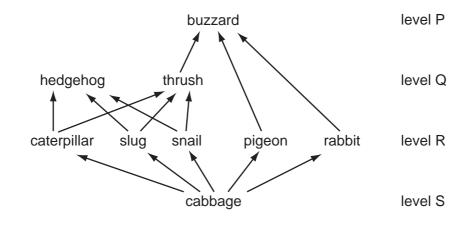
Which parts will change to focus on a distant object?

- 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

	lost as heat	present in glucose	present in protein	recycled for photosynthesis
Α	_	2	1	3
в	1	_	3	2
С	2	3	_	1
D	3	1	2	_

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

38 The diagram shows a food web.



Which levels represent carnivores?

Α	P and Q	В	P and R	С	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

5129/01/O/N/09

BLANK PAGE

5129/01/O/N/09

BLANK PAGE

5129/01/O/N/09

BLANK PAGE

5129/01/O/N/09

		0	He ⁴		20	Neon	Q	Ar	Argon	84	Кr	Krypton	131	Xe	Xenon		Rn	Radon				175	Lutetium		-	ב	103		
	-	۸II		2	19	Θ	36 5 36 5	CI	orine 18	80	Br	Bromine 8 36	127		lodine 54		At	atine 86				173	Yb Vtterbium	7					
	_	>					6		17			36	,		53			n Astatine 85						7			102 102		
		>			91 (0	8	S	Sulfur 16	62	Se	Selenium 34	128	Te	Tellurium 52		Ро	Polonium 84				169	T Thulium	69		Ma	101		
		>			44	Nitrogen	31	•	Phosphorus 15	75	As	Arsenic 33	122	Sb	Antimony 51	209	<u>8</u>	Bismuth 83				167	Erbium	68	Ľ	E	100		
		2			12	0	6 28	Si	Silicon 14	73	Ge	Germanium 32	119	Sn	50 Tin	207	Pb	Lead 82				165	Holmium	67	Ĺ	ES	Ellistellium 99		
		=			÷ I	Boron B	5	A1	Aluminium 13	70		Gallium 31	115	In	1ndium 49	204	11	Thallium 81				162	Dy	66	č		98 98		
nts										65	Zn	Zinc 30	112	Cd	Cadmium 48	201	Hg					159	Tb Terbium		ā		97 97		
The Periodic Table of the Elements										64	Cu	Copper 29	108	Ag	Silver 47	197	Au	Gold 79				157	Gdolinium	64	ć	E a	96		
ic Table of th	Group									59	ÏZ	Nickel 28	106	Pd	Palladium 46	195	Ŧ	Platinum 78				152	Europium	63		Am	95 95		
iodic Tal	Gro	Hydrogen										59	ပိ	Cobalt 27	103	Rh	Rhodium 45	192	Ir	Iridium 77				150	Sa marium	62	ć	Pu -	94
The Per			- I	1						56	Fe	lron 26	101	Ru	Ruthenium 44	190	0s	Osmium 76					Promethium	61		dz	93		
		-			1					55	Mn	Manganese 25		ЦС	Technetium 43	186	Re	Rhenium 75				144		60	238		92 01 81 92		
										52	ບັ	Chromium 24	96	Мо	Molybdenum 42	184	3	Tungsten 74				141		59	Ċ	Ра	91		
										51	>	Vanadium 23	93	qN	Niobium 41	181	Та	Tantalum 73				140	Cerium		232		90		
										48	F	Titanium 22	91	Zr	Zirconium 40	178	Ħf	Hafnium 72							c mass	0			
										45	Sc	Scandium 21	68	≻	Yttrium 39	139	La	57 *	227	Ac	Actinium 89 †	series	iries		a = relative atomic mass	\mathbf{X} = atomic symbol	b = proton (atomic) number		
		=			o	Beryllium	24	Mg	Magnesium 12	40	Ca	Calcium 20	88	Sr	Strontium 38	137	Ba	Barium 56	226		Radium 88	*58-71 Lanthanoid series	†90-103 Actinoid series	ſ			a q		
	F	_			7	Lithium	23	Na	Sodium	39	×	Potassium 19 2	85	Rb	Rubidium	133	Cs	Caesium 5		Fr	Francium 87 8	-71 Lar	-103 Ac			key X	٩		

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

. University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

5129/01/O/N/09