

COMBINED SCIENCE

Paper 1 Multiple Choice

0653/12 October/November 2011 45 minutes

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.

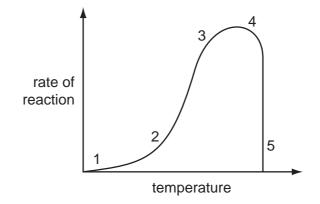
This document consists of 14 printed pages and 2 blank pages.



- 1 Which leaf tissue has specialised cells that surround stomata?
 - A epidermis
 - **B** palisade mesophyll
 - C phloem
 - D xylem
- 2 Which parts of a cell control its activities and control what enters and leaves it?

	controls cell's activities	controls what enters and leaves the cell
Α	chloroplast	cell surface membrane
в	chloroplast	cell wall
С	nucleus	cell surface membrane
D	nucleus	cell wall

- 3 Which part of a plant cell is made of cellulose?
 - A cell membrane
 - B cell wall
 - **C** chloroplast
 - D nucleus
- 4 The graph shows the effect of temperature on the rate of an enzyme-controlled reaction.



Where on the graph has all the enzyme been denatured?

A 1 **B** 2 and 3 **C** 3 and 4 **D** 5

5 When a leaf is photosynthesising, in which direction do gases diffuse through the stomata?

	carbon dioxide	oxygen
Α	in	in
в	in	out
С	out	in
D	out	out

6 What happens during digestion?

	large pieces of food are broken into small pieces	large molecules are broken into small molecules
Α	\checkmark	\checkmark
В	\checkmark	X
С	X	\checkmark
D	×	X

7 Oxygenated blood returns to the heart from the lungs in vessel X and leaves the heart to circulate around the body in vessel Y.

What are X and Y?

	Х	Y
Α	aorta	pulmonary vein
в	pulmonary artery	vena cava
С	pulmonary vein	aorta
D	vena cava	pulmonary artery

- 8 Which method of family planning is also likely to reduce the risk of the spread of syphilis?
 - A condom
 - **B** intra-uterine device (IUD)
 - **C** pill
 - D sterilisation

9 A species of animal reproduces both sexually and asexually.

Which offspring will be clones?

	offspring from sexual reproduction	offspring from asexual reproduction
Α	\checkmark	✓
В	\checkmark	x
С	x	\checkmark
D	x	X

10 The table shows the level of alcohol in a person's blood after drinking two litres of beer.

time after drinking beer (hours)	alcohol in the blood (grams/dm³)
1	7
2	5
3	3
4	0

How long will it be (in hours) before the person's reaction time returns to normal?

A 0 to 1 **B** 1 to 2 **C** 2 to 3 **D** 3 to 4

11 The diagram shows a food chain.



Which types of energy are represented by the black arrows and by the white arrows?

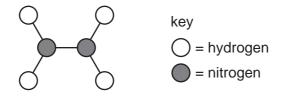
	black arrows	white arrows
Α	chemical	heat
в	chemical	light
С	heat	chemical
D	light	chemical

- 12 Which process reduces soil erosion on hilly ground?
 - A cutting down the trees
 - **B** increasing the number of grazing animals
 - **C** ploughing up and down the hilly ground
 - **D** terracing the hilly ground
- **13** Albino humans cannot make any pigment in their skin.

A pale-skinned student, who is **not** an albino, sits in the sun on a number of days. The student's skin becomes suntanned (darker).

What causes this suntanning to happen?

- A the environment and the student's albino alleles
- B the environment and the student's non-albino alleles
- **C** the environment only
- D the student's genes only
- **14** A model of a molecule is shown.



Which description and formula are correct for this molecule?

	description	formula
Α	compound	NH_2
в	compound	N_2H_4
С	mixture	NH_2
D	mixture	N_2H_4

15 Element X has a nucleon number of 40.

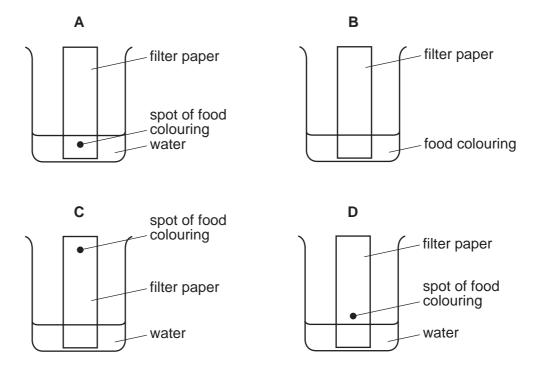
The electron arrangement of element X is 2,8,8.

Which statements about element X are correct?

- 1 It has 40 neutrons in its nucleus.
- 2 It has 2 electrons in its outer shell.
- 3 It is unreactive.
- 4 It is in Group 0 of the Periodic Table.

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

16 Which diagram shows how a mixture of dyes in a food colouring are separated?



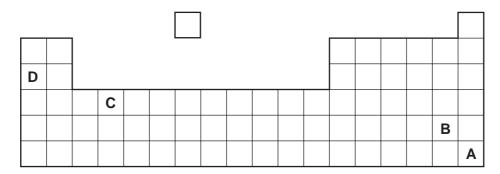
17 Sulfur dioxide is formed as a pollutant when fossil fuels are burned.

Which properties does sulfur dioxide have?

	toxic	acidic	corrosive
Α	1	1	1
в	\checkmark	1	x
С	\checkmark	x	x
D	X	X	X

- 18 Which equation is correctly balanced?
 - **A** $2Al + 3Cl_2 \rightarrow 2AlCl_3$
 - $\textbf{B} \quad \text{Fe}_2\text{O}_3 + 3\text{C} \rightarrow 2\text{Fe} + 3\text{CO}_2$
 - $\textbf{C} \quad \mathsf{KC}\mathit{l} + \mathsf{Br}_2 \to \mathsf{KBr} + \mathsf{C}\mathit{l}_2$
 - $\textbf{D} \quad Na + H_2O \rightarrow NaOH + H_2$
- **19** A soft metal reacts vigorously with cold water.

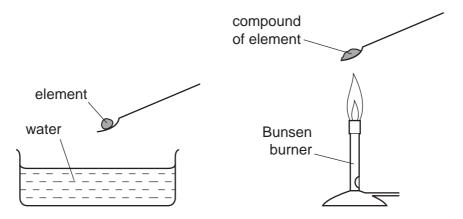
Which letter shows the position of this metal in the Periodic Table?



- 20 Which two elements do not form an alloy?
 - A carbon and sulfur
 - B carbon and iron
 - **C** copper and zinc
 - **D** silver and gold

21 In an experiment the elements calcium, copper, potassium and sodium were separately reacted with water.

In a second experiment a flame test was carried out on compounds of each of the elements.

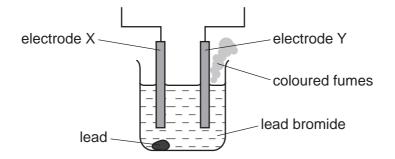


Which row correctly shows the reaction of the elements with water and the colour of the flame?

	element	reaction with water	colour of the flame
Α	calcium	vigorous	green
в	copper	no reaction	red
С	potassium	vigorous	lilac
D	sodium	no reaction	yellow

22 The diagram shows the electrolysis of lead(II) bromide using inert electrodes.

Lead is formed at electrode X and coloured fumes at electrode Y.



Which statement about the electrolysis of lead(II) bromide is correct?

- A Electrode X is the anode.
- **B** The colour of the fumes is brown.
- **C** The lead(II) bromide is in aqueous solution.
- **D** The mass of the lead(II) bromide does not change during the reaction.

23 When compound X is added to pure water, the pH increases.

Which formula could not be a correct formula for X?

A HNO_3 **B** KOH **C** NaOH **D** NH_3

24 Ethene burns as shown.

 $C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(I)$

What happens to ethene in this reaction?

- A decomposition
- B neutralisation
- **C** oxidation
- **D** reduction
- 25 Many molecules of X combine to form a single molecule Y as shown in the equation.

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n \: X \to Y
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(n is a very large number)

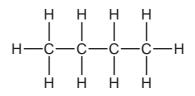
Which terms best describe X and Y in this reaction?

	Х	Y
Α	fraction	monomer
в	monomer	fraction
С	monomer	polymer
D	polymer	fraction

26 Which change does not alter the rate of reaction between zinc and dilute sulfuric acid?

- **A** addition of a catalyst
- B change in concentration of the acid
- **C** change in atmospheric pressure
- D change in temperature

27 The structure of a molecule is shown.



Which term correctly describes this molecule?

- A hydrocarbon
- B monomer
- C petroleum
- D polymer
- **28** The table gives information about a liquid in a container.

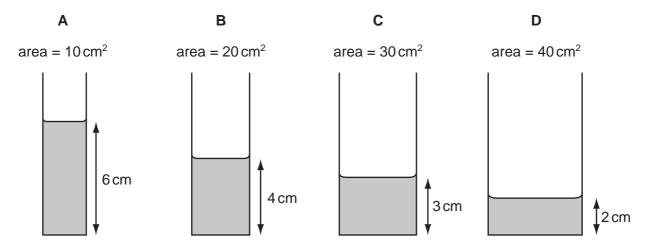
depth of liquid	10 cm
mass of liquid	30 g
temperature of liquid	25°C
volume of liquid	20 cm ³

What is the density of the liquid?

A 0.33 cm/g **B** 1.2 g/°C **C** 1.5 g/cm³ **D** 3.0 g/cm

29 Some water is poured into four tubes of different cross-sectional areas.

Which tube holds the largest volume of water?



- 30 What is the meaning of the *weight* of an object?
 - A the density of the material from which it is made
 - B the force exerted on it by gravity
 - **C** the mass of the matter it contains
 - D the pressure it exerts on the ground
- 31 Which source releases energy by burning when it is used in the process of generating electricity?
 - A a fossil fuel
 - B hydroelectric
 - C nuclear
 - D solar
- **32** An object travels 6.0 km in 2 minutes.

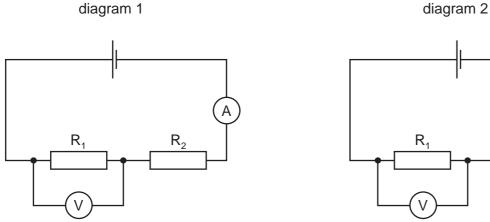
What is its speed?

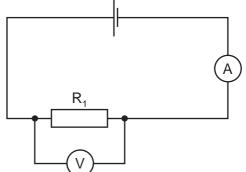
- **A** 0.050 m/s **B** 3.0 m/s **C** 50 m/s **D** 3000 m/s
- 33 When flying, some birds use warm air currents to gain height.

What is the cause of these currents?

- A conduction
- **B** convection
- **C** evaporation
- **D** radiation

 R_2 is then removed, as shown in diagram 2.





How do the readings on the ammeter and the voltmeter change when R₂ is removed?

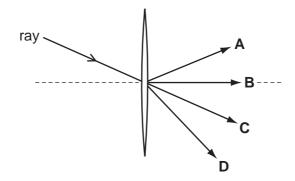
	ammeter	voltmeter
Α	decreases	decreases
в	decreases	increases
С	increases	decreases
D	increases	increases

- 35 Why is a fuse used in an electric circuit in a house?
 - Α to increase the resistance of the circuit
 - to keep the power used to a minimum value В
 - to prevent a short circuit from occurring С
 - D to stop the cables overheating
- 36 Which row shows two of the essential items used in the construction of a transformer?

	iron core	permanent magnet	primary coil	slip rings
Α	\checkmark	\checkmark		
В	\checkmark		\checkmark	
С		\checkmark		\checkmark
D			1	\checkmark

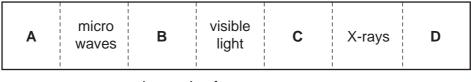
37 A ray of light passes through the centre of a thin converging lens.

In which direction does the ray leave the lens?



38 The diagram shows the spectrum of electromagnetic waves.

Which labelled region represents gamma rays?



- 39 Which is the best description of a wave that is a quiet, high-pitched sound?
 - **A** large amplitude and high frequency.
 - **B** large amplitude and low frequency.
 - **C** small amplitude and high frequency.
 - **D** small amplitude and low frequency.
- 40 Which nuclear process occurs in the Sun, and which process is used in a nuclear power station?

	in the Sun	in a nuclear power station
Α	fission	fission
в	fission	fusion
С	fusion	fission
D	fusion	fusion

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15

	0	Heium	2	00	Ne	Neon 10	40	Ar	Argon 18	84	ĸ	Krypton 36	131	Xe	Xenon 54		Rn	Radon 86				175	Ľ	Lutetium 71		Ļ	Lawrencium 103
	ll>			19	2 LL	Fluorine 9	35.5	Cl	Chlorine 17	80	Ŗ	Bromine 35	127	I	lodine 53		At	Astatine 85				173	٩۲	Ytterbium 70		°N N	Nobelium 102
	7			16	2 0	Oxygen 8		S	Sulfur 16	79	Se	Selenium 34	128	Te	Tellurium 52		Ро	Polonium 84				169		Thulium 69		Md	Mendelevium 101
	>			14	Z	Nitrogen 7	31	٩.	Phosphorus 15	75	As	Arsenic 33	122	Sb	Antimony 51	209	Bi	Bismuth 83				167	Ъ	Erbium 68		Fm	Fermium 100
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										51	>	Vanadium 23	93	qN	Niobium 41	181	Та	Tantalum 73				140	မီ ပို	Cerium 58	232		Thorium 90
										48	F	Titanium 22	91	Zr	Zirconium 40	178	Ħf	Hafnium 72							nic mass	loc	ic) number
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	=			6	Be	Beryllium 4	24	Mg	Magnesium 12	40	Ca	Calcium 20	88	Sr	Strontium 38	137	Ba	Barium 56	226	Ra	Radium 88	*58-71 Lanthanoid series	190-103 Actinoid series			××	= q
												Potassium 19			Rubidium 7			Caesium			Francium		i m				٩

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