



# UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

Se. COM

**COMBINED SCIENCE** 

0653/13

Paper 1 Multiple Choice

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.

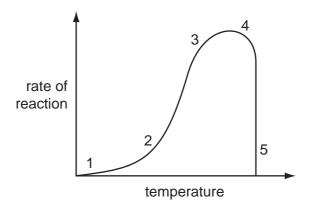


www.PapaCambridge.com

- 1 Which part of a plant cell is made of cellulose?
  - A cell membrane
  - B cell wall
  - **C** chloroplast
  - **D** nucleus
- 2 Which leaf tissue has specialised cells that surround stomata?
  - A epidermis
  - B palisade mesophyll
  - C phloem
  - **D** xylem
- 3 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

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

www.PapaCambridge.com Oxygenated blood returns to the heart from the lungs in vessel X and leaves the heart 5 around the body in vessel Y.

What are X and Y?

	Х	Υ
Α	aorta	pulmonary vein
В	pulmonary artery	vena cava
С	pulmonary vein	aorta
D	vena cava	pulmonary artery

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

What happens during digestion?

	large pieces of food are broken into small pieces	large molecules are broken into small molecules
Α	✓	✓
В	✓	x
С	X	✓
D	X	x

A species of animal reproduces both sexually and asexually. 8

Which offspring will be clones?

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

www.PapaCambridge.com 9 The table shows the level of alcohol in a person's blood after drinking two litres of bear

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
- В 1 to 2
- **C** 2 to 3
- 3 to 4

10 Which method of family planning is also likely to reduce the risk of the spread of syphilis?

- condom
- В intra-uterine device (IUD)
- C pill
- D sterilisation

11 Which process reduces soil erosion on hilly ground?

- cutting down the trees
- **B** increasing the number of grazing animals
- **C** ploughing up and down the hilly ground
- **D** terracing the hilly ground

**12** 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

13 The diagram shows a food chain.



www.PapaCambridge.com 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

**14** Element X has a nucleon number of 40.

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

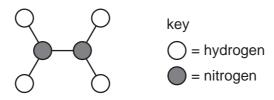
Which statements about element X are correct?

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

1 and 2

- 1 and 3
- 2 and 4
- **D** 3 and 4

15 A model of a molecule is shown.

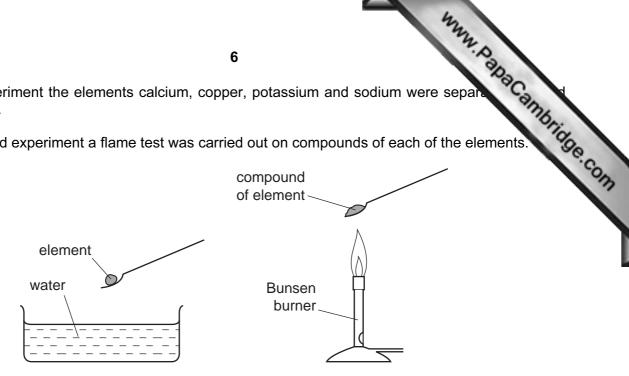


Which description and formula are correct for this molecule?

	description	formula
Α	compound	NH <sub>2</sub>
В	compound	$N_2H_4$
С	mixture	NH <sub>2</sub>
D	mixture	$N_2H_4$

16 In an experiment the elements calcium, copper, potassium and sodium were separa 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

- 17 Which two elements do **not** form an alloy?
  - A carbon and sulfur
  - В carbon and iron
  - C copper and zinc
  - **D** silver and gold
- **18** Sulfur dioxide is formed as a pollutant when fossil fuels are burned.

Which properties does sulfur dioxide have?

	toxic	acidic	corrosive
Α	✓	✓	✓
В	✓	✓	x
С	✓	X	x
D	X	X	X

19 Which equation is correctly balanced?

**A** 
$$2Al + 3Cl_2 \rightarrow 2AlCl_3$$

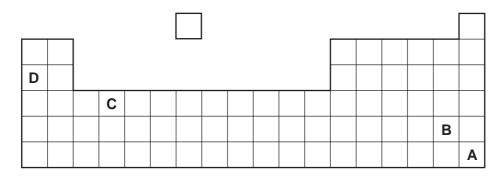
**B** Fe<sub>2</sub>O<sub>3</sub> + 3C 
$$\rightarrow$$
 2Fe + 3CO<sub>2</sub>

**C** KC
$$l$$
 + Br<sub>2</sub>  $\rightarrow$  KBr + C $l_2$ 

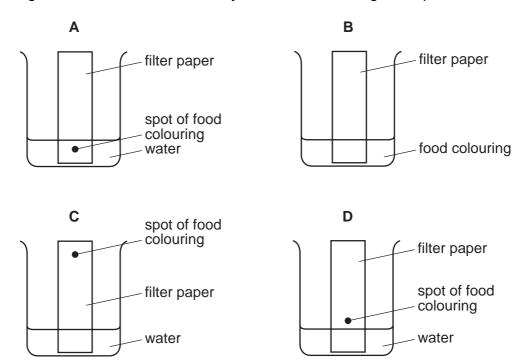
**D** Na + 
$$H_2O \rightarrow NaOH + H_2$$

20 A soft metal reacts vigorously with cold water.

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



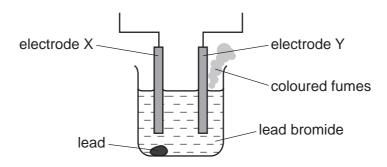
21 Which diagram shows how a mixture of dyes in a food colouring are separated?



What happens to ethene in this reaction?

- A decomposition
- **B** neutralisation
- **C** oxidation
- **D** reduction
- 23 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?

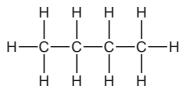
- A Electrode X is the anode.
- **B** The colour of the fumes is brown.
- **C** The lead(II) bromide is in aqueous solution.
- **D** The mass of the lead(II) bromide does not change during the reaction.
- **24** When compound X is added to pure water, the pH increases.

Which formula could **not** be a correct formula for X?

- A HNO<sub>3</sub>
- **B** KOH
- **C** NaOH
- D NH<sub>3</sub>

www.PapaCambridge.com

# 25 The structure of a molecule is shown.



Which term correctly describes this molecule?

- **A** hydrocarbon
- **B** monomer
- C petroleum
- **D** polymer

# 26 Many molecules of X combine to form a single molecule Y as shown in the equation.

$$n\: X\to Y$$

(n is a very large number)

## Which terms best describe X and Y in this reaction?

	X	Y
Α	fraction	monomer
В	monomer	fraction
С	monomer	polymer
D	polymer	fraction

## 27 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

# 28 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

29 The table gives information about a liquid in a container.

	ı
depth of liquid	10 cm
mass of liquid	30 g
temperature of liquid	25°C
volume of liquid	20 cm <sup>3</sup>

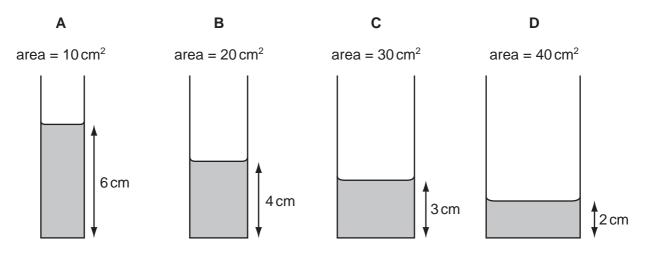
What is the density of the liquid?

- **A** 0.33 cm/g
- **B** 1.2g/°C
- **C**  $1.5 \,\mathrm{g/cm^3}$
- 3.0g/cm

www.PapaCambridge.com

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

Which tube holds the largest volume of water?



31 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

32 Which source releases energy by burning when it is used in the process of generating electricity?

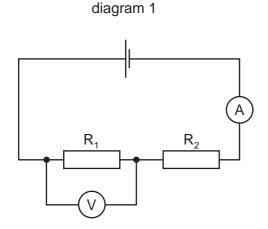
- A a fossil fuel
- **B** hydroelectric
- **C** nuclear
- **D** solar

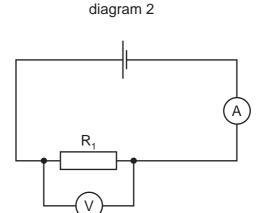
33 When flying, some birds use warm air currents to gain height.

What is the cause of these currents?

- **A** conduction
- **B** convection
- **C** evaporation
- **D** radiation
- **34** Why is a fuse used in an electric circuit in a house?
  - A to increase the resistance of the circuit
  - **B** to keep the power used to a minimum value
  - **C** to prevent a short circuit from occurring
  - **D** to stop the cables overheating
- 35 Diagram 1 shows two identical resistors  $R_1$  and  $R_2$  connected in series in a circuit.

 $R_2$  is then removed, as shown in diagram 2.





www.PapaCambridge.com

How do the readings on the ammeter and the voltmeter change when R<sub>2</sub> is removed?

	ammeter	voltmeter
Α	decreases	decreases
В	decreases	increases
С	increases	decreases
D	increases	increases

www.PapaCambridge.com 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	✓	✓		
В	✓		✓	
С		✓		✓
D			✓	✓

**37** The diagram shows the spectrum of electromagnetic waves.

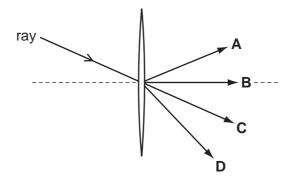
Which labelled region represents gamma rays?

A	micro waves	В	visible light	С	X-rays	D	
---	----------------	---	------------------	---	--------	---	--

increasing frequency -----

- **38** Which is the best description of a wave that is a quiet, high-pitched sound?
  - Α large amplitude and high frequency.
  - large amplitude and low frequency.
  - **C** small amplitude and high frequency.
  - D small amplitude and low frequency.
- **39** A ray of light passes through the centre of a thin converging lens.

In which direction does the ray leave the lens?



www.PapaCambridge.com 40 Which nuclear process occurs in the Sun, and which process is used in a nuclear power.

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

**BLANK PAGE** 

www.PapaCambridge.com

**BLANK PAGE** 

www.PapaCambridge.com

The Periodic Table of the Elements DATA SHEET

								Gre	Group								
_	=											=	≥	>	>	II/	0
							1 Hydrogen										4 <b>He</b> Helium
7 <b>Lithium</b>	9 Beryllium							1				11 Boron 5	12 Carbon	14 <b>X</b> Nitrogen 7	16 Oxygen	19 <b>F</b> luorine	20 <b>Neon</b>
23 <b>Na</b> Sodium	24 Magnesium											27 <b>A1</b> Auminium 13	28 <b>Si</b> Silicon	31 <b>P</b> Phosphorus 15	32 <b>S</b> Suffur	35.5 <b>C t</b> Chlorine	40 <b>Ar</b> Argon 18
39 <b>K</b> Potassium 19	Calcium Ca	Scandium	48 <b>T</b> Titanium	51 V Vanadium 23	Cr Chromium	Mn Manganese	56 <b>Fe</b> Iron	59 <b>Co</b> balt	59 Nickel	64 <b>Cu</b> Copper	65 <b>Zn</b> Zinc 30	70 <b>Ga</b> Gallium 31	73 <b>Ge</b> Germanium 32	75 <b>As</b> Arsenic 33	Selenium	80 <b>Br</b> Bromine	84 Krypton 36
Rb Rubidium	Strontium 38	89 <b>≺</b> Yttrium	2r Zirconium 40	93 <b>Nb</b> Niobium	96 <b>Mo</b> Molybdenum 42		101 <b>Ru</b> uthenium	103 <b>Rh</b> Rhodium 45	106 Pd Palladium 46	108 <b>Ag</b> Silver 47	112 <b>Cd</b> Cadmium 48	115 <b>In</b> Indium	Sn Tin	Sb Antimony 51	128 <b>Te</b> Tellurium	127 <b>I</b> lodine 53	Xe Xenon 54
133 <b>CS</b> Caesium 55	137 <b>Ba</b> Barium 56	139 <b>La</b> Lanthanum 57 *	178 <b>Hf</b> Hafnium	181 <b>Ta</b> Tantalum	184 <b>W</b> Tungsten 74		190 <b>Os</b> Osmium 76	192 <b>I r</b> Iridium	195 <b>Pt</b> Platinum 78	197 <b>Au</b> Gold	201 <b>Hg</b> Mercury 80	204 <b>T t</b> Thallium 81	207 <b>Pb</b> Lead	209 <b>Bi</b> Bismuth 83	Polonium 84	At Astatine 85	<b>Rn</b> Radon 86
<b>Fr</b> Francium 87	226 <b>Ra</b> Radium	227 <b>AC</b> Actinium 89															
*58-71 L	*58-71 Lanthanoid series 190-103 Actinoid series	series eries		140 <b>Ce</b>	Praseodymium	Neodymium	<b>Pm</b> Promethium	Samarium	152 <b>Eu</b> Europium	157 <b>Gd</b> Gadolinium	159 <b>Tb</b>	Dy Dysprosium	165 <b>Ho</b> Holmium	167 <b>Er</b> Erbium	Tm Thulium	Yb Yterbium	175 <b>Lu</b> Lutetium

1 (	3 -		140	141	144		150	152	157	159	162	165	167	169	173	175	
190-1	1 Lantha 03 Actino	58-71 Lantnanoid series 190-103 Actinoid series		<u>.</u>		Pm	Sm	Eu	gd Gd		Dy		ы	T	Υb	ר	
			Cerium 58	Praseodymium 59	Neodymium 60	Promethium 61	Samarium 62	Europium 63	Gadolinium 64	Terbium 65	Dysprosium 66	Holmium 67	Erbium 68	Thulium 69	Ytterbium 70	Lutetium 71	
	a	a = relative atomic mass	232		238												
Key	×	X = atomic symbol	드	Ра	<b>D</b>	ď	Pu	Am	CB	番	ర	Es	FB	Md	%	۲	2
	٩	b = proton (atomic) number	Thorium 90	Protactinium 91	Uranium 92	Neptunium 93	Plutonium 94	Americium 95	Curium 96	Berkelium 97	Californium 98	Einsteinium 99	Fermium 100	Mendelevium 101	Nobelium 102	Lawrencium 103	n.
			The W	The volume of one mole of any das is 24 dm <sup>3</sup> at room temperature and pressure (r t n )	alom and	of any	s is 24 dn	n3 at roon	n tempers	atilre and	חיוסיסיור	(rtn)					Pax
			2			الا	5 5	200				· (					201
																an.	1
																760	\
														•	30	-	
														1	0.00	\	
														1	20		
															1		

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.