

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

0653/11 **COMBINED SCIENCE**

October/November 2011 Paper 1 Multiple Choice

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.



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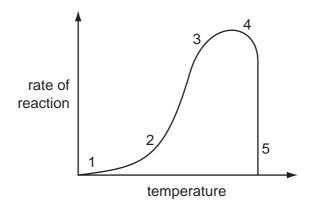
1 Which parts of a cell control its activities and control what enters and leaves it?

	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

2 Which part of a plant cell is made of cellulose?

- A cell membrane
- B cell wall
- **C** chloroplast
- **D** nucleus

3 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

4 Which leaf tissue has specialised cells that surround stomata?

- A epidermis
- B palisade mesophyll
- C phloem
- **D** xylem

5 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

6 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?

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

7 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

8 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

- 9 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
- 10 A species of animal reproduces both sexually and asexually.

Which offspring will be clones?

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

11 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

12 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

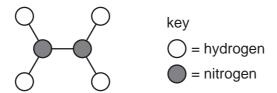
- 13 Which process reduces soil erosion on hilly ground?
 - A cutting down the trees
 - **B** increasing the number of grazing animals
 - **C** ploughing up and down the hilly ground
 - **D** terracing the hilly ground
- **14** Element X has a nucleon number of 40.

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

Which statements about element X are correct?

- 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 4

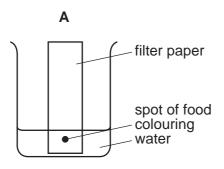
15 A model of a molecule is shown.

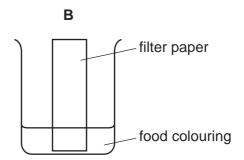


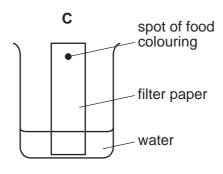
Which description and formula are correct for this molecule?

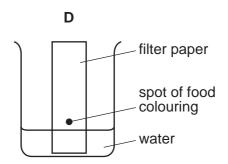
	description	formula
Α	compound	NH_2
В	compound	N_2H_4
С	mixture	NH_2
D	mixture	N_2H_4

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









17 Which equation is correctly balanced?

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

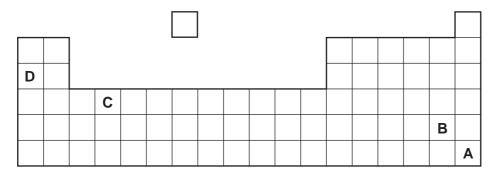
B Fe₂O₃ + 3C
$$\rightarrow$$
 2Fe + 3CO₂

C KC
$$l$$
 + Br₂ \rightarrow KBr + C l_2

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

18 A soft metal reacts vigorously with cold water.

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



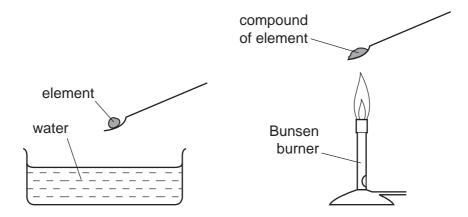
- 19 Which two elements do not form an alloy?
 - A carbon and sulfur
 - B carbon and iron
 - C copper and zinc
 - **D** silver and gold
- 20 Sulfur dioxide is formed as a pollutant when fossil fuels are burned.

Which properties does sulfur dioxide have?

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

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

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

- A HNO₃
- **B** KOH
- C NaOH
- D NH₃

23 Ethene burns as shown.

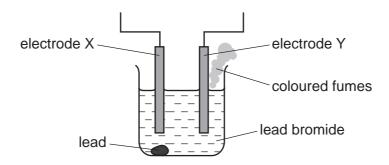
$$C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(I)$$

What happens to ethene in this reaction?

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

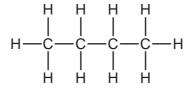
24 The diagram shows the electrolysis of lead(II) bromide using inert electrodes.

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.
- 25 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
- 26 The structure of a molecule is shown.



Which term correctly describes this molecule?

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

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

$$n\: X\to Y$$

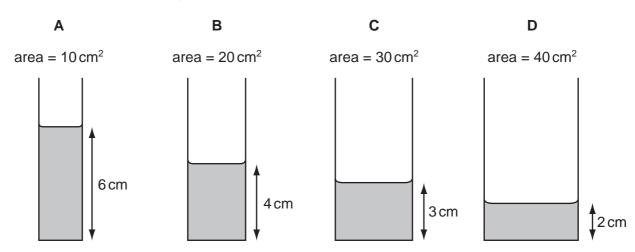
(n is a very large number)

Which terms best describe X and Y in this reaction?

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

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

Which tube holds the largest volume of water?



- **29** 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

30 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** 1.2g/°C
- **C** $1.5 \,\mathrm{g/cm^3}$
- **D** 3.0 g/cm

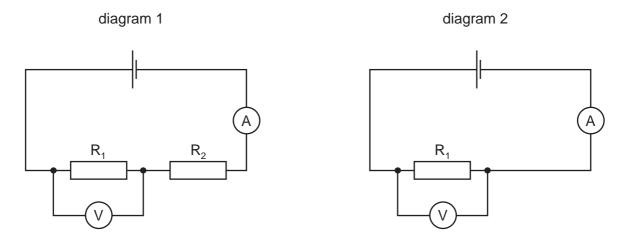
31 An object travels 6.0 km in 2 minutes.

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 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

34 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.



How do the readings on the ammeter and the voltmeter change when R_2 is removed?

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

35 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			✓	✓	

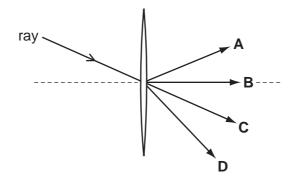
36 When flying, some birds use warm air currents to gain height.

What is the cause of these currents?

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

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

In which direction does the ray leave the lens?



39 The diagram shows the spectrum of electromagnetic waves.

Which labelled region represents gamma rays?

A	micro waves	В	visible light	С	X-rays	D
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increasing 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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DATA SHEET
The Periodic Table of the Elements

	0	4 He Helium	20 Ne Neon 10	40 Ar Argon	84 Kr Krypton 36	131 Xe Xenon Xenon 54	Rn Radon 86		175 Lu Lutetium 71	Lr Lawrencium 103
	IIA		19 Fluorine	35.5 C1 Chlorine	80 Br Bromine 35	127 I lodine lodine 53	At Astatine 85		173 Yb Ytterbium 70	Nobelium
	IN	>	16 Oxygen 8	32 Sulfur 16	Selenium	128 Te Tellurium	Po Polonium 84		169 Tm Thullum	Md Mendelevium 101
	^		14 N Nitrogen 7	31 Phosphorus 15	75 AS Arsenic	122 Sb Antimony 51	209 Bi Bismuth 83		167 Er Erbium 68	Fm Fermium
	//		12 Carbon 6	28 Si Silicon	73 Ge Germanium	119 Sn Tin	207 Pb Lead		165 Ho Holmium 67	ES Einsteinium 99
	Ш		11 Boran 5	27 A1 Auminium 13	70 Ga Gallium 31	115 In Indium	204 T (Thallium		162 Dy Dysprosium 66	C Californium 98
					65 Zn Zinc 30	Cd Cadmium 48	201 Hg Mercury		159 Tb Terbium 65	BK Berkelium 97
					64 Copper 29	108 Ag Silver 47	197 Au Gold		157 Gd Gadolinium 64	Cm Curium
Group					59 Nickel	106 Pd Palladium	195 Pt Platinum 78		152 Eu Europium 63	Am Americium 95
Ğ			1		59 Cob	103 Rh Rhodium 45	192 I r Iridium 77		Samarium 62	Pu Plutonium
		1 Hydrogen			56 Te Iron	Ruthenium 44	190 Os Osmium 76		Pm Promethium 61	Neptunium
					Mnnganese	Tc Technetium	186 Re Rhenium 75		Neodymium 60	238 U Uranium 92
					Chromium	96 Mo Molybdenum 42	184 W Tungsten 74		Pr Praseodymium 59	Pa Protactinium 91
					51 V Vanadium 23	Nobium A1	181 Ta Tantalum 73		140 Ce Cerium 58	232 Th Thorium
					48 Ti Titanium	91 Zr Zirconium 40	178 # Hafnium * 72		1	nic mass Ibol nic) number
					Scandium 21	89 < Yttrium 39	139 La Lanthanum 57 *	227 AC Actinium 89	d series series	a = relative atomic mass X = atomic symbol b = proton (atomic) number
	=		9 Be Beryllium	Mg Magnesium	40 Ca Calcium 20	Sr Strontium	137 Ba Barium 56	226 Ra Radium 88	*58-71 Lanthanoid series 190-103 Actinoid series	© × ÿ
	_		7 Li Lithium	23 Sodium 11	39 K	85 Rb Rubidium 37	133 Cs Caesium 55	Fr Francium 87	*58-71 L	Key

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