



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

SE.COM

CO-ORDINATED SCIENCES

0654/11

Paper 1 Multiple Choice

October/November 2012

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.

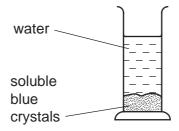
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.



- 1 Which part of a cell has the greatest mass?
 - A cytoplasm
 - **B** membrane
 - C nucleus
 - **D** vacuole
- 2 Apparatus is set up as shown.

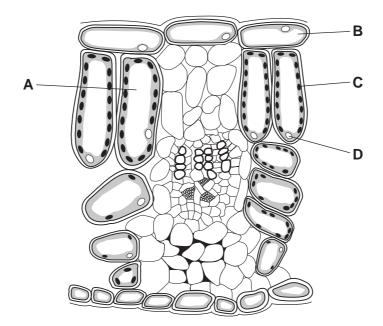


After several hours, all the water has turned blue.

Which process causes this colour change to take place?

- **A** assimilation
- **B** diffusion
- **C** digestion
- **D** evaporation
- 3 The diagram shows a section through a green leaf.

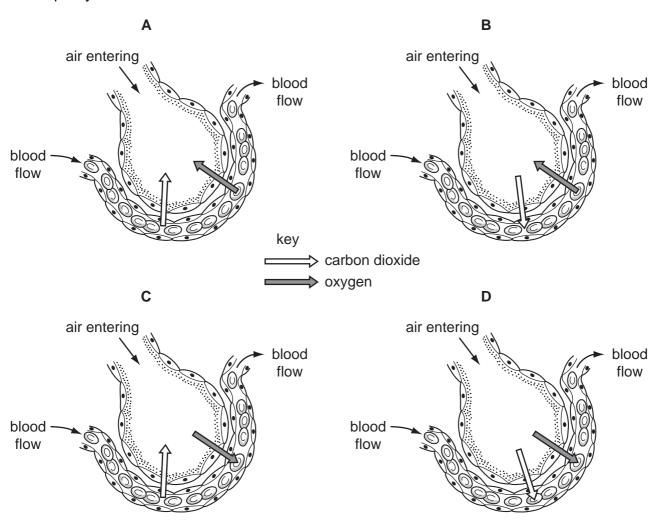
Where are carbohydrates made?



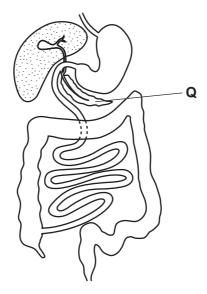
- www.PapaCambridge.com
- How should the diet of a weight-lifter differ from the diet of an office worker?
 - A She should eat less fat.
 - **B** She should eat more protein.
 - C She should eat less carbohydrate.
 - **D** She should eat more fibre.
- 5 Which vessels carry blood towards the heart?

	aorta	pulmonary artery	pulmonary vein	vena cava		
Α	✓	✓	X	X		
В	✓	X	✓	x		
С	X	✓	✓ X		✓	
D	X	X	✓	✓		

6 Which diagram shows the diffusion of carbon dioxide and oxygen between an alveolus and a capillary?



- 7 Which process would **not** work well in an adult person whose diet consists solely of h
 - **A** absorption of digested food into the blood
 - **B** digestion of fats in the milk
 - **C** maintenance of strong bones
 - **D** movement of food along the intestines
- 8 The diagram shows the human alimentary canal.



Proteases are produced by structure Q.

What is structure **Q** and which nutrient does protease digest?

	structure Q	nutrient digested		
Α	liver	fat		
В	liver	protein		
С	pancreas	fat		
D	pancreas	protein		

- **9** Which is an example of homeostasis?
 - A adding acid to food in the stomach
 - **B** breathing out water vapour from the lungs
 - **C** keeping the body temperature steady
 - **D** producing adrenaline in the adrenal glands

10 Which process is taking place as pollen lands on the stigma of a flower?

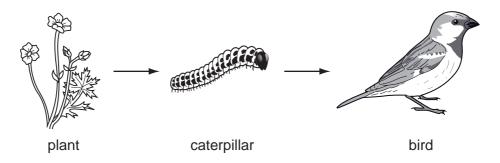
- A asexual reproduction
- **B** fertilisation
- **C** germination
- **D** pollination

11 Allele T is dominant over allele t.

Which cross will produce offspring with phenotypes in a 1:1 ratio?

- \mathbf{A} $\mathsf{tt} \times \mathsf{tt}$
- $\textbf{B} \quad Tt \times Tt$
- \mathbf{C} $\mathsf{Tt} \times \mathsf{tt}$
- $\mathbf{D} \quad \mathsf{TT} \times \mathsf{tt}$

12 The diagram shows a food chain.



Which row is correct?

	plant	caterpillar	bird	
Α	makes energy	eats leaves	uses energy	
В	makes starch	is a producer	is a consumer	
С	photosynthesises	digests food	eats animals	
D	traps light	feeds on plants	is a decomposer	

13 In the carbon cycle, several different processes may release carbon dioxide from dead organisms.

Which process does not do so?

- A combustion
- **B** decomposition
- C photosynthesis
- **D** respiration

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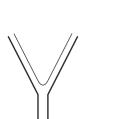
14 Hexane and octane are liquid hydrocarbons that mix together.

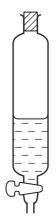
Which is the best method of separating a mixture of these two liquids?

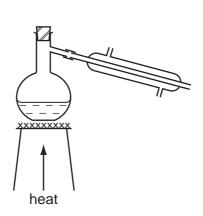
Α

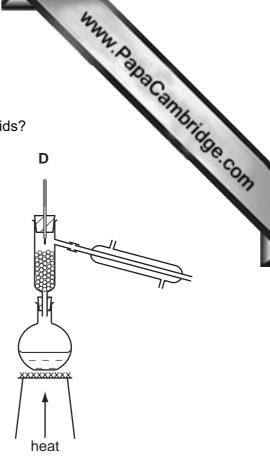
В

C







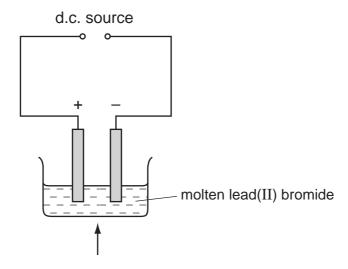


15 What are the charge and mass of an electron?

	charge	mass		
Α	+1	negligible		
В	+1 1			
С	– 1	negligible		
D	–1	1		

16 Molten lead(II) bromide is electrolysed as shown.

An element is produced at the negative electrode.



What is the name of the element and of the electrode?

	element	electrode		
Α	bromine	anode		
В	bromine	cathode		
С	lead	anode		
D	lead	cathode		

17 Burning coal has advantages and disadvantages.

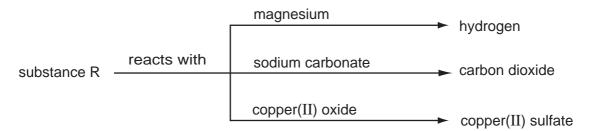
Which row is correct?

the reaction is exothermic		the reaction can cause 'acid rain'		
Α	advantage	advantage		
В	advantage	disadvantage		
С	disadvantage	advantage		
D	disadvantage	disadvantage		

$$\mathsf{CaCO_3} \ + \ 2\mathsf{HC}\mathit{l} \ \rightarrow \ \mathsf{CaC}\mathit{l}_2 \ + \ \mathsf{CO_2} \ + \ \mathsf{H}_2\mathsf{O}$$

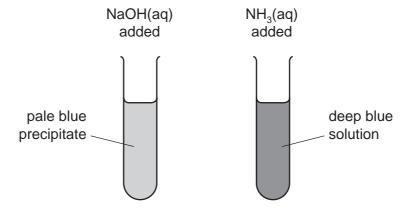
Which change increases the speed of the reaction?

- A Decrease the temperature of the hydrochloric acid.
- **B** Increase the concentration of the hydrochloric acid.
- **C** Increase the size of the calcium carbonate particles.
- **D** Increase the volume of the hydrochloric acid.
- 19 Some reactions of a substance, R, are shown in the diagram.



What type of substance is R?

- A an acid
- B a base
- C an element
- **D** a salt
- **20** The diagrams show the results of adding an excess of aqueous sodium hydroxide and aqueous ammonia to separate solutions of salt S.



Which metal ion is present in salt S?

- \mathbf{A} Cu^{2+}
- **B** Fe²⁺
- C Fe³⁺
- **D** Zn²⁺

21 An element X has a high melting point and its oxide is coloured.

Which row is correct?

	element	oxide		
Α	transition metal	acidic		
В	transition metal	basic		
С	non-metal	acidic		
D	non-metal	basic		

22 The atoms of two elements can be represented by $^4_2 X\,$ and $^{20}_{10} Y\,.$

Which properties do both elements have?

	they are gaseous	they are unreactive		
Α	✓	✓		
В	✓	X		
С	X	✓		
D	X	x		

23 Alloys are metals formed by dissolving one metal in another.

Alloys areX.....

.....Y..... alloys conduct electricity.

Which words correctly complete the statements?

	Х	Y	
Α	compounds	All	
В	compounds	Some	
С	mixtures	All	
D	mixtures	Some	

24 The table gives some information about the reactivity of three different metals.

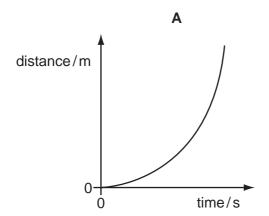
ie	table give	10 s some information about the reactiv	rity of three different metals.	6.0
	metal	reaction with water or steam	reaction with dilute hydrochloric acid	andride.
	Х	reacts with cold water	reacts with cold acid	ac.Co
	Υ	no reaction when heated in steam	no reaction when boiled with acid	NA.
	Z	reacts when heated in steam	reacts when warmed with acid	

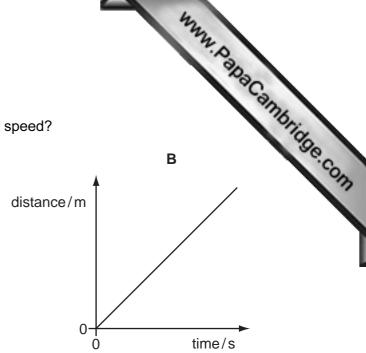
What is the order of reactivity of the three metals?

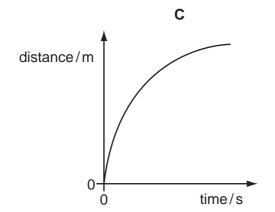
	most reactive	>	least reactive
Α	Х	Υ	Z
В	X	Z	Y
С	Υ	Z	X
D	Z	X	Υ

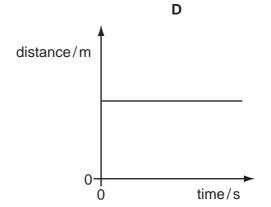
- 25 Which three elements do most fertilisers contain?
 - A Na, C, P
- **B** Na, P, K
- **C** K, C, N
- **D** K, P, N
- 26 Which process produces molecules with long chains?
 - A combustion of hydrocarbons
 - **B** cracking
 - **C** fractional distillation of petroleum
 - **D** polymerisation
- 27 Which of the following is not produced by fractional distillation of petroleum?
 - A diesel fuel
 - **B** ethanol
 - **C** paraffin
 - **D** petrol

Which graph shows an object travelling at constant speed?



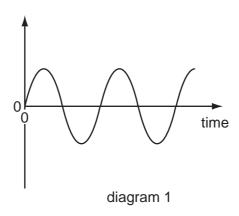






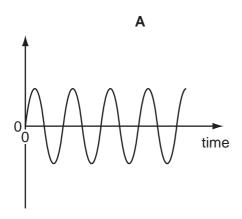
- 29 What is the density of an object that has a mass of 20 g and a volume of 5 cm³?
 - $\mathbf{A} \quad 4 \,\mathrm{g/cm^3}$
- $B 15g/cm^3$
- \mathbf{C} 25 g/cm³
- $\mathbf{D} \quad 100\,\mathrm{g/cm^3}$
- **30** Which is a non-renewable energy resource?
 - A coal
 - **B** geothermal
 - C solar
 - **D** wave
- 31 Which statement about a gas in a container of constant volume is correct?
 - **A** The less often the gas molecules collide with the container walls, the higher the pressure.
 - **B** The lower the temperature of a gas, the more often its molecules collide with the container walls.
 - **C** The pressure of a gas increases as its temperature decreases.
 - **D** The temperature of a gas increases as the speed of the gas molecules increases.

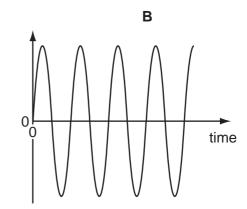
- 32 Which statement about the transfer of thermal energy is correct?
 - A Heat transfer by radiation involves mainly ultraviolet radiation.
 - **B** Heat transfer by radiation requires a medium to travel through.
 - **C** The main method of heat transfer through gases is conduction.
 - **D** The main method of heat transfer through liquids is convection.
- 33 Diagram 1 represents a wave.



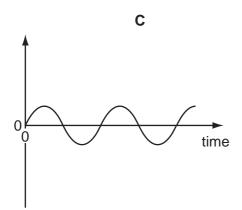
Which diagram represents a wave with double the frequency and half the amplitude of the wave in diagram 1?

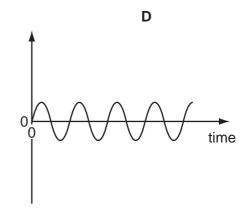
The scales are the same in all the diagrams.





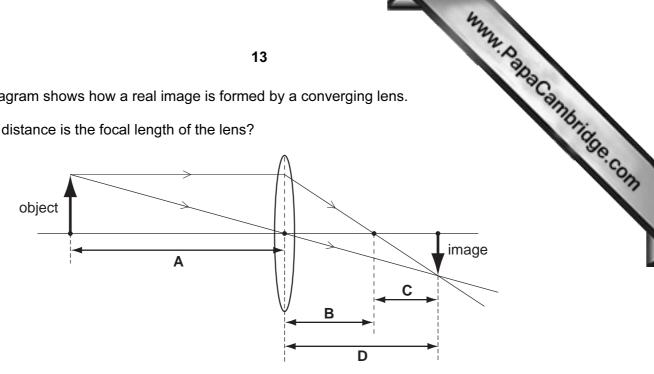
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34 The diagram shows how a real image is formed by a converging lens.

Which distance is the focal length of the lens?

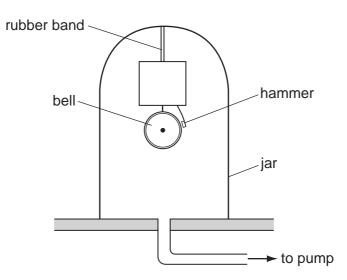


35 Radio waves, infra-red radiation and visible light are different types of electromagnetic waves.

What is true for these electromagnetic waves?

- Infra-red radiation travels more quickly than visible light. Α
- Radio waves travel more quickly than infra-red radiation. В
- С Radio waves travel at the same speed as visible light.
- D Visible light travels more slowly than radio waves.

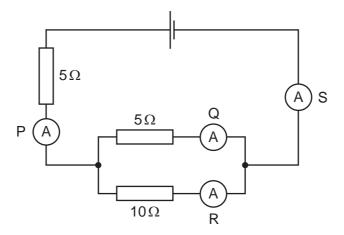
www.papaCambridge.com 36 An electric bell with its own battery is suspended by a rubber band inside a sealed hammer hits the bell and makes it ring. A pump can remove air from the jar.



The pump is switched on and the air is removed from the jar. The hammer still hits the bell but the sound becomes quieter until it cannot be heard.

Why does this happen?

- An electric current cannot flow in a vacuum.
- В A medium is required to transmit sound waves.
- C The bell cannot be made to vibrate in a vacuum.
- The pitch of the note is now outside the range of human hearing.
- **37** The circuit contains four ammeters, P, Q, R and S.



Which statement about the readings on the ammeters is correct?

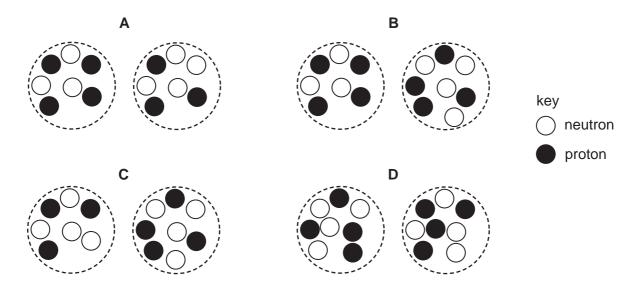
- The reading on S is less than the reading on P.
- В The reading on Q is greater than the reading on S.
- C The reading on R is less than the reading on S.
- The reading on Q is greater than the reading on P.

38 A student wishes to measure an e.m.f. and a potential difference.

Which meter(s) does she need?

- A an ammeter only
- B a voltmeter only
- C a voltmeter and an ammeter
- **D** a voltmeter and a newton meter
- 39 Which type of radiation has the greatest ionising effect?
 - **A** α -particles
 - **B** β -particles
 - **C** γ -rays
 - **D** infra red rays
- **40** The diagrams represent pairs of nuclei of some atoms.

Which pair shows nuclei of different isotopes of the same element?



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The Periodic Table of the Elements DATA SHEET

	0	Helium	20 Ne on	40 Ar Argon	34 Pton	131 Xe Xenon	Radon		75
		· ∓ ∄	9	8	84 Kr Krypton 36	5 × × 8	98		175 Lu Lutetium
	\		19 Fluorine	35.5 C1 Chlorine	80 Br Bromine	127 	At Astatine 85		173 Yb Ytterbium
	IA		16 Oxygen 8	32 Sul fur	79 Selenium 34	128 Te Tellurium	Po Polonium 84		169 Tm
	>		14 N Nitrogen 7	31 Phosphorus	75 AS Arsenic	122 Sb Antimony 51			167 Er
	\sim		12 Carbon 6	28 Si Silicon	73 Ge Germanit	Sn Tin 50	207 Pb Lead 82		165 Ho lmium
	=		11 Boron 5	27 A1 Aluminium	70 Ga Gallium 31	115 n Indium	204 T 1 Thallium		162 Dy Dysprosium
					65 Zn Zinc	112 Cd Cadmium 48	201 Hg Mercury 80		159 Tb
					64 Cu Copper	108 Ag Silver	197 Au Gold		157 Gd Gadolinium
Group					59 Nickel 28	106 Pd Palladium 46	195 Pt Platinum 78		152 Eu Europium
Gre					59 Co Cobalt	103 Rh Rhodium	192		150 Sm Samarium
		1 Hydrogen			56 Fe Iron	Ru Ruthenium	190 OS Osmium 76		Pm Promethium
			•		Mn Manganese 25	Tc Technetium 43	186 Re Rhenium 75		144 Na Neodymium
					52 Cr Chromium 24	96 Mo Molybdenum 42	184 W Tungsten 74		141 Pr Praseodymium
					51 V Vanadium 23	Niobium 41	181 Ta Tantalum		140 Ce
					48 T Itanium	2r Zrconium 40	178 Hf Hafnium * 72		
					Sc Scandium 21	89 ×	139 La Lanthanum 57 *	227 Ac Actinium	series eries
	=		Be Beryllium 4	24 Mg Magnesium	40 Ca Calcium	Strontium	137 Ba Barium 56	226 Ra Radium 88	nthanoid ctinoid se
	_		7 Li Lithium	23 Na Sodium	39 K Potassium 19	Rb Rubidium	133 Cs Caesium 55	Fr Francium 87	*58-71 Lanthanoid series 190-103 Actinoid series
			1	1		1	ı		, - +

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.). Californium 98 90

Mo

Fm

Es

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Currium

Am

Ра

232 **Th**

b = proton (atomic) number

28

a = relative atomic mass X = atomic symbol

Key

Plutonium Pu

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