

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/13

45 minutes

Paper 1 Multiple Choice

May/June 2010

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.

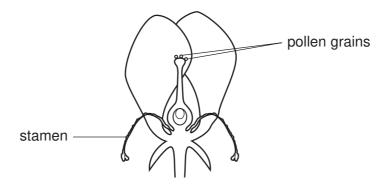
Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 20.

This document consists of 19 printed pages and 1 blank page.



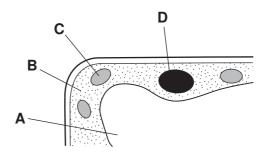
1 The diagram shows a flower whose stamens are dying.



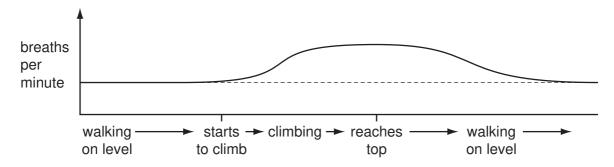
Which process has occurred in this flower?

- **A** fruit formation
- **B** pollination
- **C** seed formation
- **D** wind dispersal
- 2 Which part of the gut is in the form of a coiled tube?
 - A large intestine
 - **B** oesophagus
 - C rectum
 - **D** small intestine
- 3 The diagram shows part of a plant cell.

In which region does most of the cell's respiration occur?



4 The graph shows changes in his rate of breathing as a boy first walks on the level then climbs a long stair and then walks on the level again.



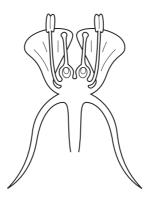
Why does his breathing continue for a while at the higher rate after he reaches the top of the stairs?

- A He is oxidising lactic acid.
- **B** He still needs more energy.
- **C** His breathing muscles respond slowly.
- **D** More glucose is being used up.
- 5 The allele for red hair is recessive.

If a girl has red hair, which statement about her parents must be correct?

- A Both parents must carry a recessive allele.
- **B** Both parents must have red hair.
- **C** One parent must carry a dominant allele.
- **D** The father must have red hair.

6 The diagram shows a section through a flower.

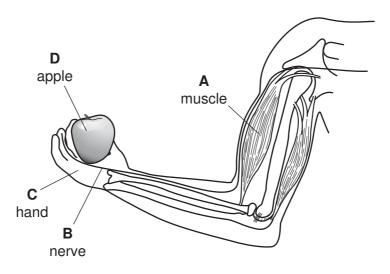


Use the key to identify the flower.

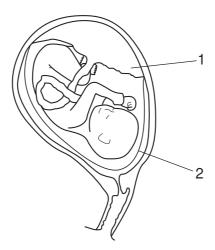
1	flower with many ovules in each ovary	go to 2
	flower with one ovule in each ovary	go to 3
2	filaments longer than styles	Α
	filaments shorter than styles	В
3	petals shorter than sepals	С
	petals longer than sepals	D

7 The diagram shows a person holding an apple.

If the person decides to lift the apple, which labelled part is the effector?



8 The diagram shows a human embryo inside a uterus.

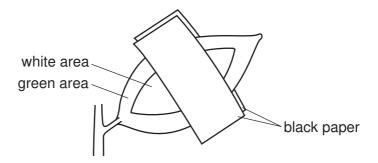


What are the functions of the numbered parts?

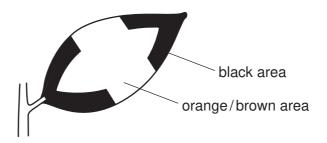
	1	2		
Α	hold the embryo in place	make blood for the embryo		
В	protect the embryo	remove waste		
С	provide food	provide food		
D	remove waste	protect the embryo		

- **9** What would be the effect on the blood of an over-secretion of insulin?
 - A high levels of glucose
 - B high levels of urea
 - C low levels of glucose
 - **D** low levels of urea

10 A plant, each leaf of which is green and white, is destarched. It is then placed in light with black paper over part of one leaf as shown.



After 12 hours, the leaf is tested for starch using iodine solution. The diagram below shows the leaf after this test.

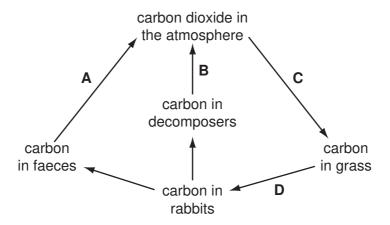


Where has photosynthesis occurred?

- A all areas covered by black paper
- B all areas not covered by black paper
- **C** green areas covered by black paper
- **D** green areas not covered by black paper
- 11 In a balanced diet, which constituents provide most energy?
 - A carbohydrate and protein
 - B fat and carbohydrate
 - C fat and fibre
 - **D** vitamins and protein

12 The diagram shows a simple carbon cycle.

Which line should have an arrowhead at both ends?



13 The diagram shows a food chain.

Sunlight energy
$$\rightarrow$$
 P $\xrightarrow{1}$ Q $\xrightarrow{2}$ R $\xrightarrow{3}$ S

Where do energy losses occur?

- A 1 only B
 - **B** 1 and 2 only
- C 2 and 3 only
- **D** 1, 2 and 3
- 14 During the weathering of rocks, which process does **not** take place?
 - A chemical change
 - **B** fixation of nitrogen
 - C physical change
 - D release of salts into the soil
- **15** When element X reacts with element Y, X donates an electron to Y.

Which row correctly shows the type of ion that Y forms and how its position in the Periodic Table changes?

	type of ion	effect on position of element Y in Periodic Table
Α	negative	moves one place to the right
В	negative	no change
С	positive	moves one place to the right
D	positive	no change

- **16** An aqueous solution of a compound of metal M is tested.
 - It does not give a characteristic flame colour.
 - It forms a precipitate with aqueous ammonia; the precipitate is soluble in excess ammonia.

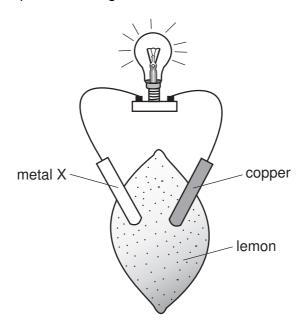
What is metal M?

- A copper
- **B** iron
- **C** potassium
- **D** zinc
- 17 Nitrogen oxides are formed when car engines burn fossil fuels.

Which row shows why nitrogen oxides are unwanted products?

	acidic	pollutant
Α	no	no
В	no yes	
С	yes	no
D	yes	yes

18 The diagram shows an experiment using a lemon.



Which statements are correct?

	lemon juice is an electrolyte X could be co		X could be zinc		
Α	✓	✓	✓		
В	✓	✓	x		
С	✓	×	✓		
D	X	✓	✓		

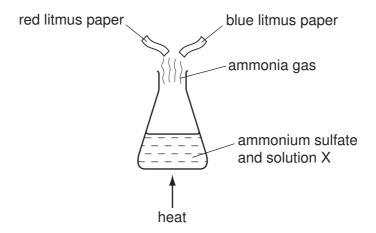
19 Chlorophyll is extracted from green plants.

Which method should be used to separate chlorophyll from other coloured substances?

- A chromatography
- **B** cracking
- **C** distillation
- **D** neutralisation

20 Ammonium sulfate is heated with solution X and ammonia gas is given off.

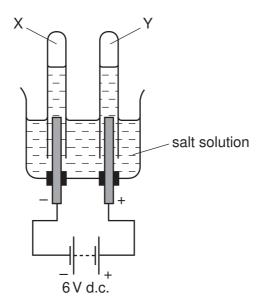
A piece of moist red litmus paper and a piece of moist blue litmus paper are held in the gas.



What is solution X and what will be the colour change of the litmus paper?

	solution X	colour change of litmus paper
Α	hydrochloric acid	blue to red
В	hydrochloric acid	red to blue
С	sodium hydroxide	blue to red
D	sodium hydroxide	red to blue

21 When concentrated salt solution is electrolysed, two gases X and Y are formed.



One of the gases explodes when tested with a burning splint and the other turns moist Universal Indicator paper red then white.

What are X and Y?

	Х	Y
Α	chlorine	hydrogen
В	hydrogen	chlorine
С	hydrogen	oxygen
D	oxygen	chlorine

22 The contents of a beaker scatter a beam of light.

What does the beaker contain?

- A aqueous copper(II) sulfate
- **B** ethanol
- C milk
- **D** water

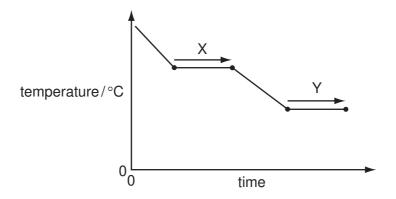
23 The table shows the name and formula of four metal ores.

	name	formula
1	chalcopyrite	CuFeS ₂
2	ilmenite	FeTiO₃
3	malachite	Cu ₂ CO ₃ (OH) ₂
4	wolframite	FeWO ₄

Which metal ores contain two different metals?

- A 1 and 3 only
- B 2 and 4 only
- **C** 1, 2 and 4 only
- **D** 2, 3 and 4 only
- 24 Which property of an element suggests that it is a metal?
 - A It conducts electricity.
 - **B** It forms covalent compounds.
 - **C** It has a low density.
 - **D** It has a low melting point.
- 25 What is an important use of the diesel fraction obtained from crude oil?
 - A fuel for lorries and buses
 - **B** lubricant for door hinges
 - C propellant gas for spray cans
 - D wax for waterproofing car bodies

26 The graph shows the changes in temperature when a substance is cooled.



Which row in the table describes X and Y?

	Х	Υ
Α	boiling	freezing
В	boiling	melting
С	condensing	freezing
D	condensing	melting

- 27 Which material is combined with a metal oxide to make glass?
 - A carbon
 - B carbon dioxide
 - C silicon
 - D silicon(IV) oxide
- 28 The table gives four pairs of values of force and the surface area on which the force acts.

Which pair of values gives the largest pressure on the surface?

	force/N	area/m²
Α	20	2
В	40	2
С	20	4
D	40	4

- 29 Which is the correct equation for resistance?
 - A resistance = current ÷ voltage
 - **B** resistance = power ÷ current
 - **C** resistance = power ÷ voltage
 - **D** resistance = voltage ÷ current
- **30** The winner of a 1500 m race takes 4 minutes to run the race.

What is his average speed in m/s?

- **A** $1500 \times \frac{60}{4}$
- **B** 1500 × 4 × 60
- **c** $\frac{1500}{4 \times 60}$
- **D** $\frac{1500 \times 4}{60}$
- 31 A sample of radioactive material has a mass of 64 mg and a half-life of 16 years.

What is the time taken for the mass of the sample to decrease to 8 mg?

- A 2 years
- **B** 4 years
- C 48 years
- D 128 years
- 32 A magnet and a charged plastic rod are held near each other.

N S

magnet

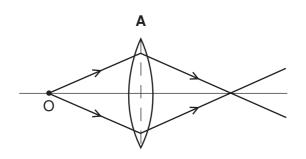


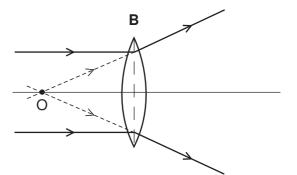
charged plastic rod

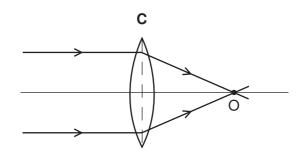
What happens?

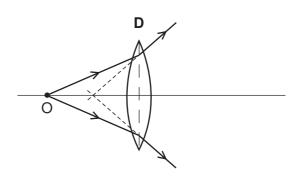
- A Both poles of the magnet attract both ends of the plastic rod.
- **B** Neither pole of the magnet attracts either end of the plastic rod.
- **C** Only the north pole of the magnet attracts the positive end of the plastic rod.
- **D** Only the south pole of the magnet attracts the positive end of the plastic rod.

33 Which ray diagram shows a converging lens producing a real image of object O?

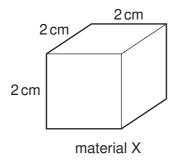


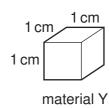






34 The cubes shown are made of different materials, but they have the same mass.





The density of material X is $1g/cm^3$.

What is the density of material Y?

- **A** $\frac{1}{8}$ g/cm³ **B** $\frac{1}{2}$ g/cm³ **C** 2 g/cm³
- \mathbf{D} 8g/cm³

35 A rod is acted upon by two forces as shown in the diagram.



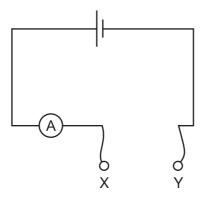
Which effect will be produced by these two forces?

- A both rotation and movement in a straight line
- **B** rotation only
- **C** no effect, because the forces are balanced
- **D** movement in a straight line only
- **36** Liquid X has a higher specific heat capacity than liquid Y.

What does this mean?

- **A** 1 kg of liquid X needs to be given more energy than 1 kg of liquid Y to make it evaporate.
- **B** 1 kg of liquid X releases more energy than 1 kg of liquid Y when it freezes.
- **C** More energy needs to be supplied to 1 kg of liquid X than to 1 kg of liquid Y for their temperatures to rise by the same amount.
- **D** The temperature of 1 kg of liquid X rises more than the temperature of 1 kg of liquid Y when they are given the same amount of energy.

37 A student has four pieces of resistance wire made of the same material. Each piece is connected in turn between the terminals X and Y in the circuit.



In which wire will the current be the smallest?

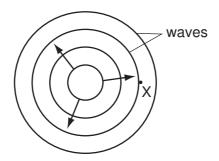
	length/m	diameter/mm		
Α	0.5	0.5		
В	0.5	1.0		
С	1.0	0.5		
D	1.0	1.0		

38 A householder asks an electrician to install a mains electrical socket in her bathroom so that she may use a hairdryer there. The electrician refuses to do this because it would be dangerous.

Why would installing the socket be dangerous?

- **A** The current drawn by the hairdryer would cause overheating in the cables.
- **B** The handling of electrical equipment in damp conditions could cause an electric shock.
- **C** The hot air produced by the hairdryer would cause the fuse to melt.
- **D** The temperature in the bathroom would damage the insulation.

39 A stone is thrown into a pool and waves spread out from where it hits the water.



What is the name given to the number of waves passing point X per second?

- A the amplitude
- **B** the frequency
- C the wavelength
- D the wave speed
- 40 Which statement about radioactive emissions is correct?
 - **A** Alpha-particles are the least penetrating and are positively charged.
 - **B** Alpha-particles are the most penetrating and are positively charged.
 - **C** Gamma-rays are the least penetrating and are positively charged.
 - **D** Gamma-rays are the most penetrating and are positively charged.

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DATA SHEET
The Periodic Table of the Elements

0	4 He Helium	Neon 10 Argan	18	84 K rypton 36	131 Xe Xenon 54	Rn Radon		175 Lu Lutetium 71	Lawrencium 103
=		19 Fluorine 9 35.5 C.	17	80 Br Bromine	127 I lodine	At Astatine 85		173 Yb Ytterbium 70	Nobelium
>		_		79 Selenium 34	128 Te Tellurium			169 Tm Thulium 69	Md Mendelevium 101
>		Nitrogen 7 31 31	15	75 As Arsenic	122 Sb Antimony	209 Bi Bismuth 83		167 Er Erbium 68	Fm Fermium 100
≥				73 Ge Germanium 32	S Tin	207 Pb Lead		165 Ho Holmium 67	ES Einsteinium 99
=		11 BB Boron 5 27 Aluminium	13	70 Ga Gallium	115 In Indium	204 T t Thallium 81		162 Dy Dysprosium 66	Cf Californium 98
	'			65 Zn Zinc 30	112 Cd Cadmium 48	201 Hg Mercury 80		159 Tb Terbium 65	BK Berkelium 97
				64 Copper 29	108 Ag Silver 47	197 Au Gold		157 Gd Gadolinium 64	Cm Curium 96
				59 Nicke l 28	106 Pd Palladium 46	195 Pt Platinum 78		152 Eu Europium 63	Am Americium 95
				59 Co Cobalt 27	Rhodium 45	192 I r Iridium 77		150 Sm Samarium 62	Pu Plutonium 94
	1 H Hydrogen			56 Fe Iron 26	Ruthenium	190 Os Osmium 76		Pm Promethium 61	Neptunium
				Mn Manganese 25	Tc Technetium 43	186 Re Rhenium 75			238 U Uranium 92
				CC Chromium 24	96 Mo Molybdenum 42	184 W Tungsten 74		141 Pr Praseodymium 59	Pa Protactinium 91
				51 V Vanadium 23	Niobium A1	181 Ta Tantalum 73		140 Ce Cerium	232 Th Thorium
				48 T tranium 22	91 Zr Zirconium 40	178 Ha thium Hathium 72			nic mass bol nic) number
				Scandium 21	89 × Yttrium 39	139 La Lanthanum 57 *	227 Ac Actinium 89	l series eries	 a = relative atomic mass X = atomic symbol b = proton (atomic) number
=		Beryllium 4 24 Mg Magnesium	12	40 Ca Calcium	Strontium 38	137 Ba Barium 56	226 Ra Radium 88	anthanoid Actinoid s	а Х
-		Lithium 3 Lithium 3 23 23 Na Sodium	11	39 K Potassium	85 Rb Rubidium 37	133 Cs Caesium 55	Fr Francium 87	*58-71 L	Key _o
		1	III IV VII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII	III IIV VII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII VIII VIII VIII VIII VIII VIII VIIII VIII VIII	III	1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1	1	1 1 1 1 1 1 1 1 1 1

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

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