

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

0653/12 **COMBINED SCIENCE**

October/November 2010 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.

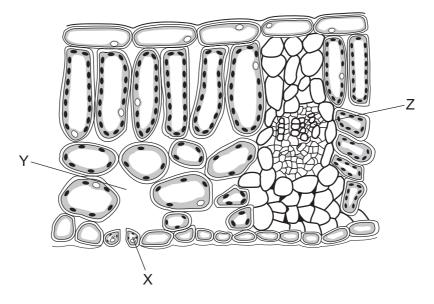
Any rough working should be done in this booklet.

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



International Examinations

1 The diagram shows a section through a leaf.



What are X, Y and Z?

	Х	Y	Z
Α	epidermis cell	air space	phloem
В	epidermis cell	stoma	xylem
С	guard cell	air space	xylem
D	guard cell	stoma	phloem

When a plant cell is placed in a dilute solution of red dye, the contents of the cell do not become red.

What prevents the dye molecules from entering the cell?

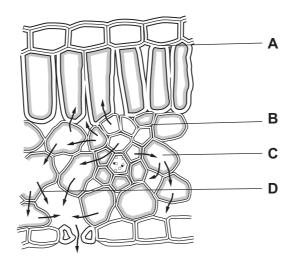
- A cell surface membrane
- **B** chloroplasts
- C cytoplasm
- **D** vacuole
- **3** Which part of a plant cell contains starch grains?
 - A cell wall
 - **B** chloroplasts
 - C nucleus
 - **D** vacuole

4 Which is correct for all enzymes?

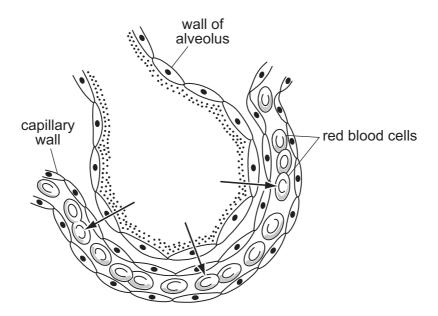
	made of proteins	made inside cells
Α	✓	✓
В	✓	X
С	X	✓
D	X	X

- 5 Which nutrient, when deficient in the diet, causes a lack of haemoglobin in red blood cells?
 - **A** calcium
 - **B** iron
 - C vitamin C
 - **D** vitamin D
- **6** The diagram shows a section through a leaf. The arrows show water movement.

Where does the water evaporate?



7 The diagram shows an alveolus and one of its capillaries.



What moves in the direction shown by the arrows?

- A carbon dioxide
- **B** hydrogen
- C oxygen
- **D** water
- **8** Which blood vessel carries oxygenated blood away from the heart?
 - A aorta
 - **B** pulmonary artery
 - C pulmonary vein
 - D vena cava
- **9** What is the stimulus for insulin secretion and what is the effect of insulin on the liver?

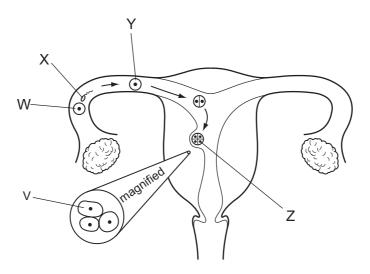
	stimulus for secretion	effect on the liver
Α	high blood glucose	decreased glucose uptake
В	high blood glucose	increased glucose uptake
С	low blood glucose	decreased glucose uptake
D	low blood glucose	increased glucose uptake

- 10 Which variation amongst humans is not affected by diet?
 - A blood group
 - **B** bone strength
 - C height
 - **D** speed of wound healing
- **11** The table shows the names of plant reproductive structures.

Which does **not** link a structure with what it contains?

	structure	what it contains
Α	anther	pollen grain
В	fruit	seed
С	seed	embryo
D	style	ovule

12 The diagram shows the uterus and stages in the formation and implantation of a human embryo.



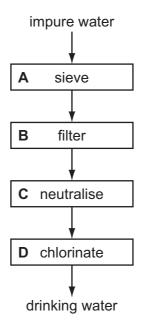
Which cells are genetically identical?

- A W and Z
- **B** X and V
- C X and Y
- **D** Y and Z

- 13 What will increase soil erosion?
 - A deforestation
 - **B** maintaining natural plant cover
 - C reducing grazing by livestock
 - **D** terracing of the land

14 The chart shows four stages in the purification of drinking water.

Which stage sterilises the water?



- **15** Which three elements are all transition elements?
 - A chlorine, bromine and iodine
 - **B** helium, neon and argon
 - **C** iron, cobalt and nickel
 - **D** lithium, sodium and potassium
- **16** Three students make statements about the differences between elements, compounds and mixtures.

Student 1 All elements exist only as atoms and not molecules.

Student 2 Compounds contain at least two elements.

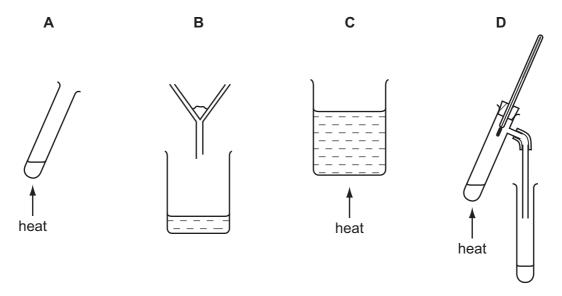
Student 3 Mixtures consist only of compounds.

Which students are correct?

A 1 only **B** 2 only **C** 3 only **D** 1, 2 and 3

17 Aqueous copper(II) sulfate consists of copper(II) sulfate dissolved in water.

Which apparatus could **not** be used to remove water from this solution?



18 The table shows information about four different compounds.

Which compound contains ionic bonds?

	formula of compound	elements present in compound
Α	CO ₂	carbon, oxygen
В	HC1	hydrogen, chlorine
С	NH_3	nitrogen, hydrogen
D	Na₂O	sodium, oxygen

19 The equation represents the reaction of aluminium with sulfuric acid.

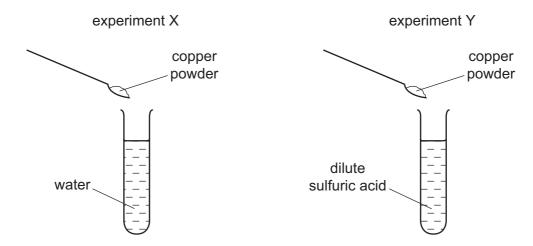
$$xAl + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + yH_2$$

What are the correct values of x and y?

	Х	У
Α	2	3
В	2	6
С	3	3
D	3	6

20 Aqueous copper(II) ions, Cu²⁺(aq), are blue.

In separate experiments, X and Y, copper powder is added to a test-tube of liquid and the mixture stirred. At the end of each experiment some copper powder remains at the bottom of each tube.



What are the final colours of the liquids above the copper powder?

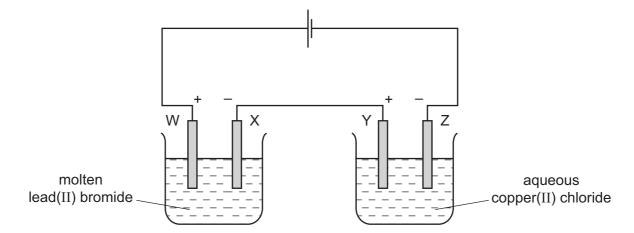
	experiment X	experiment Y
Α	blue	blue
В	blue	colourless
С	colourless	blue
D	colourless	colourless

21 Aluminium occurs as aluminium oxide in the ore bauxite.

Which terms apply to the extraction of aluminium from aluminium oxide?

	electrolysis	reduction
Α	✓	✓
В	✓	X
С	x	✓
D	X	X

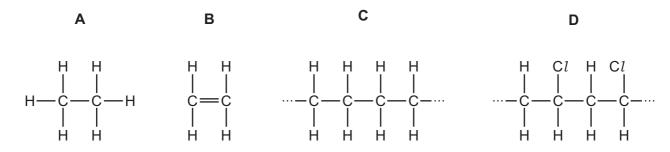
22 An electrolysis circuit is set up using carbon electrodes as shown.



At which two electrodes would a Group VII element be formed?

- A W and Y
- **B** W and Z
- C X and Y
- **D** X and Z

23 Which structure shows a polymer that is also a hydrocarbon?



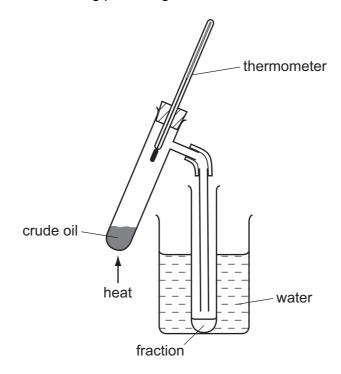
24 Two products, X and Y, are formed in the complete combustion of methane.

What are X and Y?

- A carbon and hydrogen
- B carbon and water
- C carbon dioxide and hydrogen
- D carbon dioxide and water

25 Crude oil (petroleum) is heated, using the apparatus shown.

Four fractions, with different boiling point ranges, are collected.



Which term best describes crude oil?

A a compound

B an element

C a mixture

D a plastic

26 The equations for two reactions are shown.

X PbCO₃
$$\rightarrow$$
 PbO + CO₂

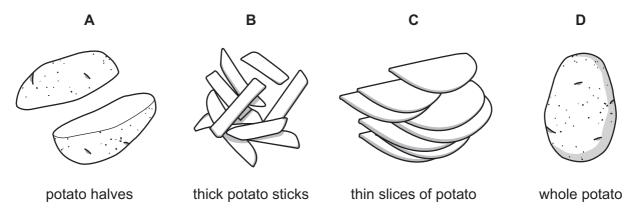
Y
$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

Which types of reaction are X and Y?

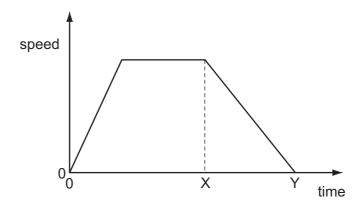
	X	Υ
Α	combustion	neutralisation
В	combustion	thermal decomposition
С	thermal decomposition	combustion
D	thermal decomposition	neutralisation

27 A 250 g portion of potatoes is to be cooked in boiling water.

Which form of the potatoes will require the shortest cooking time?



28 The graph shows how the speed of an object changes over an interval of time.



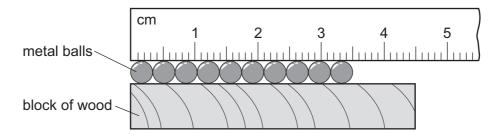
Which statement describes the acceleration of the object between time X and time Y?

- A It is constant.
- **B** It is decreasing.
- C It is increasing.
- **D** It is zero.

29 Which substance in the table has the lowest density?

	substance	mass/g	volume/cm ³
Α	nylon	1.2	1.0
В	cotton	1.5	1.0
С	olive oil	1.8	2.0
D	water	2.0	2.0

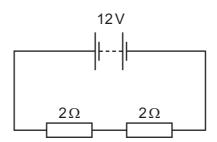
- 30 Which statement is correct?
 - **A** The mass of a bottle of water at the North Pole is different from its mass at the Equator.
 - **B** The mass of a bottle of water is measured in newtons.
 - **C** The weight of a bottle of water and its mass are both measured in kilograms.
 - **D** The weight of a bottle of water is one of the forces acting on the bottle.
- 31 A ruler and a block of wood are used to find the diameter of some identical metal balls.



What is the diameter of a single ball?

- **A** 3.5 mm
- **B** 4.5 mm
- **C** 3.5 cm
- **D** 4.5 cm

32 The diagram shows an electrical circuit.

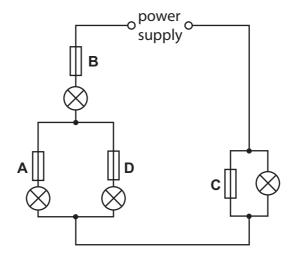


What is the current through the circuit?

- **A** 3A
- **B** 4A
- **C** 12A
- **D** 24 A

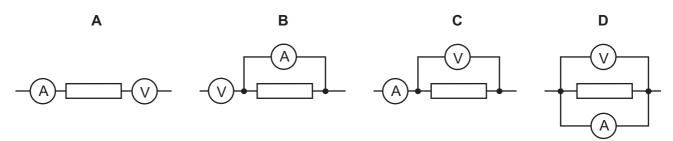
33 In the circuit shown, only one of the fuses has blown, but none of the lamps is lit.

Which fuse has blown?



34 The diagrams show part of an electric circuit containing an ammeter and a voltmeter.

Which arrangement should be used to measure the potential difference (p.d.) across the resistor and the current through it?



35 In a hydroelectric power station, one form of energy is stored in a reservoir. This energy is then transferred in stages to another form, which is the output.

Which row gives the names for the stored energy and the output energy?

	stored energy	output energy
Α	electrical	heat
В	electrical	kinetic
С	kinetic	electrical
D	potential	electrical

36 A camper sits beside a fire and quickly begins to feel warm. He pushes the end of a metal rod into the fire and after a while his hand feels the rod getting warm.

Which heat transfers are taking place?

	heat transfer from fire through the air	heat transfer from fire through the rod
Α	conduction	convection
В	conduction	radiation
С	radiation	conduction
D	radiation	convection

37 The Sun heats the Earth by electromagnetic radiation.

Which region of the electromagnetic spectrum is responsible for most of this heating?

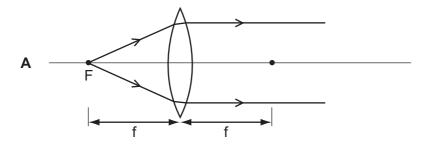
- A microwave
- B infra-red
- **C** ultraviolet
- **D** X-ray
- **38** A police car with its siren sounding is stationary in heavy traffic. A pedestrian notices that, although the loudness of the sound produced does not change, the pitch varies.

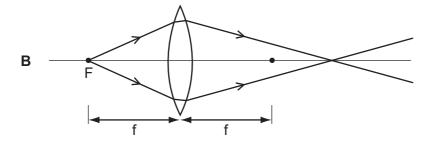
Which row in the table describes the amplitude and the frequency of the sound?

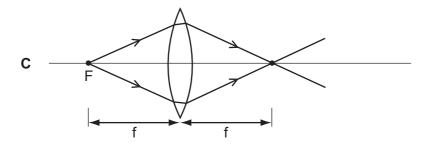
	amplitude	frequency
Α	constant	constant
В	constant	varying
С	varying	constant
D	varying	varying

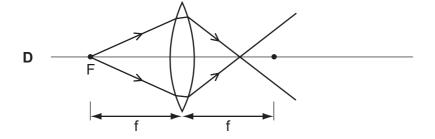
39 A source of light is placed at the focus F of a converging lens. The focal length of the lens is f.

Which diagram shows the path of the rays of light that pass through the lens?









Which row in the table describes alpha-particles?

	electric charge	penetrates 1 cm of aluminium?					
Α	negative	yes					
В	negative	no					
С	positive	yes					
D	positive	no					

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DATA SHEET
The Periodic Table of the Elements

	0	4 He Helium	20 Ne Neon 10	40 Ar Argon	88 ¾ Syston	36	131	Xenon	54	ć	Radon 86		175 Lu Lutetium 71	Lr Lawrencium	103		
	II/		19 Fluorine	35.5 C1 Chlorine	80 Bromine		127	lodine		*	At Astatine 85		Y b Ytterbium 70				
			16 Oxygen	32 S Sulfur	79 Se		128	Tellurium		ć	Polonium 84		169 Tm Thulium 69	Mendelevium			
	>		14 Nitrogen 7	31 Phosphorus		33	122	Sb		509	Bismuth 83		167 Er Erbium 68	Fm Fermium			
	2				12 C Carbon 6	28 Si icon		32	119	S =		207	Lead RS		165 Ho Holmium 67	Einsteinium	
	≡							11 Boron 5	27 A1 Auminium 13	Gallium		115	L P	49	204	Thallium 81	
		· ·			65 Zinc	30	112	Cadmium	48	201	Mercury 80		159 Tb Terbium 65	BK Berkelium	1		
					64 Copper	29	108	Ag Silver		197	Gold 79		157 Gd Gadolinium 64	Carrium			
Group					29 Nickel	28	106	Pd Palladium	46	195	Platinum		152 Eu Europium 63	Am Americium	L		
Gro					8 8 8	27	103	Rh odium	45	192	Iridium 77		Sm Samarium 62	Pu Plutonium			
		1 Hydrogen			. H	26	101	Ru Ruthenium	44	190	Osmium 76		Pm Promethium 61	Neptunium			
					Mn Manganese	25	l		43	186	Rhenium 75		Neodymium 60	238 Uranium	5		
-					Chromium	24	96	Molybdenum	42	184	Tungsten 74		Pr Praseodymium 59	Pa Protactinium	5		
					51 Vanadium	23	93	N iobium	41	181 F	Tantalum 73		140 Ce Cerium	232 Th	6		
					48 Titanium	22	91	Zironium	40	178	72		1	nic mass lbol	nic) number		
					Scandium	21	68	>	39	139	Lanthanum 57 *	227 Ac Actinium †	d series series	a = relative atomic mass X = atomic symbol	b = proton (atomic) number		
	=		Beeryllium	Mg Magnesium	Calcium	20	88	Strontium	38	137	Barium 56	226 Ra Radium	*58-71 Lanthanoid series	a X			
	_		7 Lithium	Na Sodium	39 Kotassium	19	85	Rb Rubidium	37	133	Caesium 55	Fr Francium 87	*58-71 L	Key	9		

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

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