



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/12

Paper 1 Multiple Choice

May/June 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.

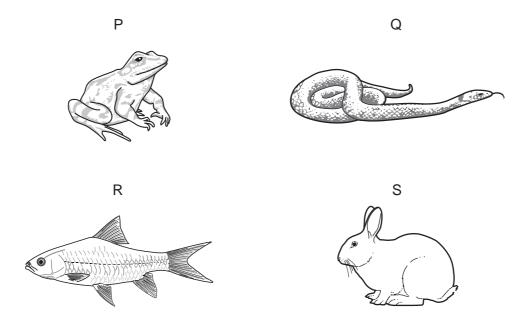
A copy of the Periodic Table is printed on page 16.



International Examinations



- 1 Which process releases energy in all living things?
 - A breathing
 - **B** digestion
 - **C** muscle contraction
 - **D** respiration
- 2 The diagram shows four vertebrate animals.

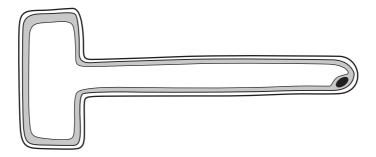


Which animals have lungs?

- A P, Q and R
- **B** Q, R and S
- C R, S and P
- D S, P and Q
- 3 Which molecule carries energy into a cell and which is a process that uses this energy?

	molecule	process	
Α	glucose	growth	
В	iron	movement	
С	protein	digestion	
D	starch	storage	

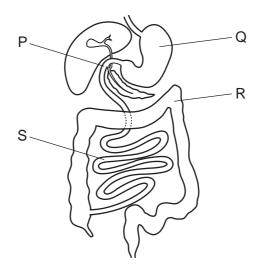
4 The diagram shows a root hair cell.



What shows that it is a plant cell?

- A It has a large surface area.
- **B** It has a large vacuole.
- C It has no cell membrane.
- **D** It has no cell wall.
- 5 What happens shortly after eating a large amount of sugar?
 - **A** More insulin is secreted by the pancreas.
 - **B** More urea is made in the liver.
 - **C** More urine is excreted by the kidneys.
 - **D** More water is removed from the blood.

6 The diagram shows part of the alimentary canal.



Where is bile added and where is acid released?

	addition of bile release of a	
Α	Р	Q
В	Q	R
С	R	S
D	S	Р

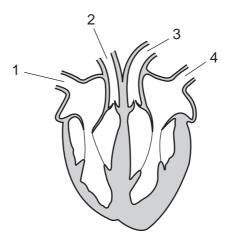
7 Tests were carried out on a clear liquid. The table shows the results.

test	result
biuret	purple colour
ethanol	white colour
iodine	brown colour

What did the clear liquid contain?

	fat	protein	starch	
Α	1	1	✓	key
В	✓	✓	X	✓= yes
С	✓	x	✓	x = no
D	X	✓	✓	

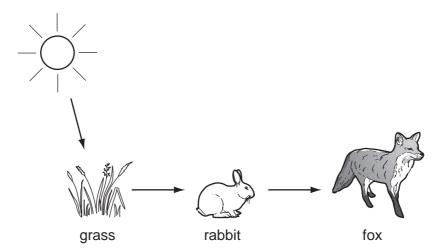
8 The diagram shows a section through the heart.



Which two blood vessels are arteries?

- **A** 1 and 2
- **B** 2 and 3
- **C** 3 and 4
- **D** 4 and 1

- **9** What is an ecosystem?
 - A a community and its habitat
 - **B** a group of organisms and their predators
 - **C** all the organisms in a food chain
 - **D** where an organism lives
- **10** The diagram shows a short food chain.



In the food chain, what is the importance of the rabbit?

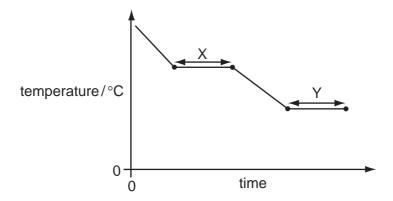
- A It absorbs carbon dioxide.
- **B** It absorbs the Sun's energy.
- **C** It passes on energy from plants.
- **D** It releases oxygen.

- 11 Which is an example of cloning?
 - A pollinating flowers by insects
 - **B** producing offspring by sexual intercourse
 - C producing plants by tissue culture
 - **D** seeds forming in an ovary
- 12 Why is seed dispersal important?
 - A It causes the development of a fruit.
 - **B** It makes seeds more fertile.
 - **C** It prevents asexual reproduction.
 - **D** It reduces competition between seedlings.
- 13 What passes from a mother to a fetus in her uterus?
 - A blood platelets
 - **B** mineral ions
 - C plasma
 - **D** red blood cells
- 14 Which trends in physical properties are correct for the alkali metals down Group I?

	hardness	melting point
Α	decreases	decreases
В	decreases	increases
С	C increases decrease	
D	increases	increases

- 15 What is made when amino acids join together in a large chain?
 - A cellulose
 - **B** glucose
 - **C** protein
 - **D** starch

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



Which describes the processes occurring at X and Y?

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

17 Some properties of three substances are shown.

substance	melting point /°C	boiling point /°C	electrical conductivity when molten
W	801	1413	good
X	-111	- 78	poor
Υ	1610	2230	poor

What are the structures of W, X and Y?

	giant covalent structure	giant ionic structure	molecular structure
Α	W	Υ	Χ
В	X	W	Υ
С	Y	W	X
D	Υ	X	W

18 Large hydrocarbons can be1...... to make smaller, more useful molecules.

Small hydrocarbon molecules can be2..... to make long molecules.

Which words correctly complete gaps 1 and 2?

	1 2	
Α	cracked	distilled
В	cracked	polymerised
С	distilled	polymerised
D	distilled	cracked

19 Electrolysis of sodium chloride is used to obtain chlorine.

In what form is sodium chloride electrolysed and at which electrode is the chlorine obtained?

	form of sodium chloride	electrode at which chlorine is obtained
Α	in aqueous solution	anode
В	in aqueous solution	cathode
С	solid	anode
D	solid	cathode

20 How is carbon (coke) used in the extraction of iron from iron oxide?

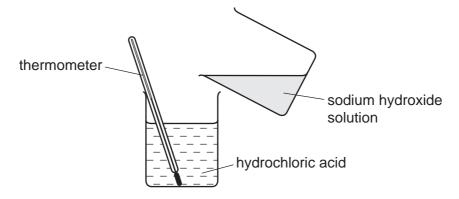
A as an anode

B as a cathode

C as an oxidising agent

D as a reducing agent

21 Sodium hydroxide solution is added to hydrochloric acid.



Which shows how the pH and temperature change as the reaction takes place?

	рН	temperature
Α	decrease	decrease
В	decrease	increase
С	increase	decrease
D	increase	increase

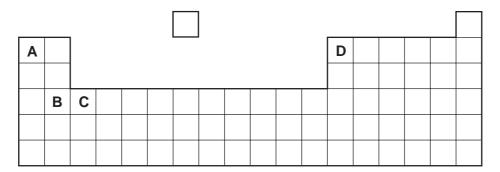
- **22** Which statements about a positive test for a nitrate ion are correct?
 - 1 Aluminium is used.
 - 2 The nitrate ion is reduced to ammonia.
 - 3 Ammonia turns damp litmus paper red.
 - **A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only
- 23 A solution is tested by adding acidified silver nitrate solution.

Which ion causes the white precipitate to form?

- **A** chloride ions, Cl^-
- **B** copper ions, Cu²⁺
- C hydroxide ions, OH⁻
- **D** sodium ions, Na⁺

- 24 Which statement about methane is **not** correct?
 - A Methane burns in air to form carbon dioxide and water.
 - **B** Methane can be obtained from the decay of waste material.
 - **C** Methane is a fossil fuel.
 - **D** When methane burns, an endothermic reaction takes place.
- 25 The diagram shows part of the Periodic Table.

Which element has atoms containing three electrons in the outer shell?



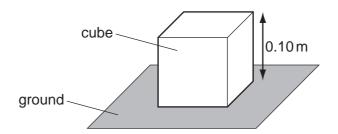
26 Aspirin can be used to relieve headaches.

Which terms correctly describe aspirin?

	analgesic	chemotherapy agent	drug	
Α	✓	✓	x	key
В	✓	x	✓	✓= yes
С	X	✓	X	x = no
D	X	x	✓	

- 27 Which is not a colloid?
 - A cellulose
 - **B** milk
 - **C** paint
 - **D** smoke

28 One side of a cube stands on the ground.



The cube weighs 200 N and its sides are 0.10 m long.

How much pressure does the cube exert on the ground?

- **A** 2.0 Pa
- **B** 20 Pa
- **C** 2000 Pa
- **D** 20 000 Pa
- 29 A student needs to find the density of a large cubic block of wood.

Which two pieces of apparatus should she use?

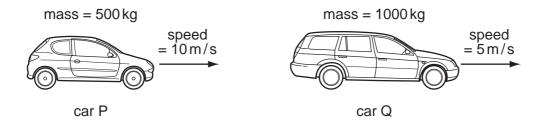
- A balance and metre rule
- **B** balance and thermometer
- **C** measuring cylinder and metre rule
- **D** measuring cylinder and thermometer
- **30** In an experiment, a student measures the time taken for an object to fall to the ground. He carries out the experiment ten times. The table shows his results.

time/s	26.4 26.8	26.4	24.4	24.0	26.8	25.4	23.4	26.4	24.0
--------	-----------	------	------	------	------	------	------	------	------

Which value should the student use?

- **A** 24.0 s
- **B** 25.4 s
- **C** 26.4 s
- **D** 26.8s
- 31 Which group contains only secondary colours of light?
 - A cyan, green, magenta
 - B cyan, green, yellow
 - C green, magenta, yellow
 - D yellow, cyan, magenta

32 Two cars have different masses and different speeds as shown.



How do the momentum and the kinetic energy of the two cars compare?

	momentum	kinetic energy
Α	P greater than Q	P less than Q
В	P equal to Q	P greater than Q
С	P equal to Q	P equal to Q
D	P less than Q	P equal to Q

33 A satellite orbits the Earth.

Is the satellite in a gravitational field and is the satellite in a magnetic field?

	a gravitational field	a magnetic field	
Α	✓	✓	key
В	✓	x	√ = in field
С	×	✓	x = not in field
D	X	X	

34 What is meant by the current in a wire?

- A the charge flowing through the wire per second
- **B** the energy the wire can transfer elsewhere per second
- C the power the wire can produce per second
- **D** the work the wire does per second

35 An electronic circuit is used as a temperature detector.



The current in the detector is small. The detector operates a component that allows it to control a larger current in a heater.

Which component is suitable?

- A a diode
- B a dynamo
- C a reed relay
- **D** a transformer
- **36** Microphones and earphones are both used with audio equipment.

Which energy change takes place in a microphone and which takes place in an earphone?

	microphone	earphone
Α	electrical to sound	electrical to sound
В	electrical to sound	sound to electrical
С	sound to electrical	electrical to sound
D	sound to electrical	sound to electrical

37 Electrical energy from a power station is used a long distance away from it.

Which row shows the type of current needed and the device used for efficient transmission?

	type of current	device
Α	alternating	dynamo
В	alternating	transformer
С	direct	dynamo
D	direct	transformer

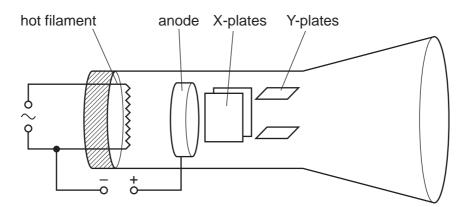
38 Which process is used in a nuclear power station and which nuclear change happens in this process?

	process used	nuclear change
Α	fission	heavy nuclei split
В	fission	light nuclei join together
С	fusion	heavy nuclei split
D	fusion	light nuclei join together

39 Which row describes the properties of beta radiation?

	electromagnetic	ionising	
Α	✓	✓	key
В	✓	×	✓= yes
С	×	✓	x = no
D	x	x	

40 The diagram shows the basic structure of a cathode-ray tube in an oscilloscope.



From which component do the cathode rays start?

- A the anode
- B the hot filament
- C the X-plates
- **D** the Y-plates

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DATA SHEET
The Periodic Table of the Elements

	0	4	He	Helium 2	20	Ne	Neon 10	40	Αľ	Argon 18	84	궃	Krypton 36	131	Xe	Xenon 54		Ru	Radon 86				175		Lutetium 71		۲	Lawrencium 103
	=>				19	ш	Fluorine 9			_		Ā	Bromine 35	127	Ι	lodine 53							173	Υp	Ytterbium 70		8	Nobelium 102
	 				16	0	Oxygen 8	32	S	Sulfur 16	79	Se	Selenium 34	128	Тe	Tellurium 52			_				169	Ε			Md	Mendelevium 101
	>				14	z	Nitrogen 7			Phosphorus 15		As	Arsenic 33	122	Sb	Antimony 51	209	B	Bismuth 83				167	ш	Erbium 68		Fm	Fermium 100
	≥				12	ပ	Carbon 6	28	Si	Silicon 14	73		Germanium 32		Sn	Tin 50	207	Pb	Lead 82				165	운	Holmium 67		Es	Einsteinium 99
	=				11	В	Boron 5	27	Ρſ	Aluminium 13	70	Ga	Gallium 31	115	In	Indium 49	204	11	Thallium 81				162	D	Dysprosium 66		ర	E
											99	Zu	Zinc 30	112	පි	Cadmium 48	201	Hg	Mercury 80				159	Д	Terbium 65			Berkelium 97
											64	ე C	Copper 29	108	Ag		197	Αn	Gold 79						Gadolinium 64		Ca	
Group											29	Z	Nickel 28	106	Pd	Palladium 46	195	Ŧ	Platinum 78				152	En	Europium 63		Am	Americium 95
Ď											29	ပိ	Cobalt 27	103		Rhodium 45	192	ľ	Iridium 77				150		Samarium 62		Pu	Plutonium 94
		-	I	Hydrogen 1							99	Fe	Iron 26	101		Ruthenium 44	190	s _O	Osmium 76						Promethium 61		ď	Neptunium 93
											55	M	Manganese 25		ပ	Technetium 43	186	Re	Rhenium 75				144	R	um Neodymium 60	238	⊃	Uranium 92
											25	ပ်	Chromium 24	96	Mo	Molybdenum 42	184	>	Tungsten 74					፵	Praseodymium 59		Ра	Protactinium 91
											51	>	Vanadium 23	l		Niobium 41	181	Та	Tantalum 73				140	రి	Cerium 58	232		Thorium 90
											48	F	Titanium 22	91	Zr	Zirconium 40	178		Hafnium 72				,			nic mass	pol	nic) number
											45	လွ	Scandium 21	88	>	Yttrium 39	139	Гa	Lanthanum 57 *	227	Ac	Actinium 89	00100	Prince	2	a = relative atomic mass	X = atomic symbol	b = proton (atomic) number
	=				6	Be	Beryllium 4	24	Mg	Magnesium 12	40	Sa	Calcium 20	88	Š	Strontium 38	137	Ba	Barium 56	226	Ra	Radium 88	*F8-71 Lanthanoid corios	30-7 1 Lantinanola sene 190-103 Actinoid series		a	× ×	٩
	_				7	=	Lithium 3	23	Na	Sodium 11	39	¥	Potassium 19	85		Rubidium 37	133	S	Caesium 55		Ĭ.	Francium 87	*58_71	190-7 - 1			Key	۵

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

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