

Cambridge International Examinations

Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/11

Paper 1 Multiple Choice

May/June 2016

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, 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.

DO NOT WRITE IN ANY BARCODES.

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.

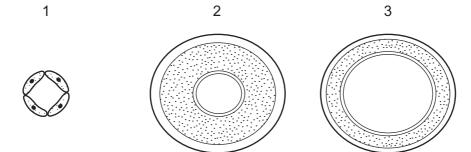
Electronic calculators may be used.



International Examinations

1	An	organism has the ability to break down nutrient molecules to release energy
	Wh	at is this process?
	Α	excretion
	В	growth
	С	nutrition
	D	respiration
2	Wh	ich is an enzyme involved in the digestion of proteins in the stomach?
	Α	amylase
	В	bile
	С	lipase
	D	protease
3	Wh	ich statement about the alimentary canal is correct?
	Α	The large intestine includes the colon and rectum.
	В	The large intestine includes the duodenum and rectum.
	С	The small intestine includes the colon and ileum.
	D	The small intestine includes the ileum and rectum.
4	Wh	ich chemical element is found in proteins, but not in carbohydrates or fats?
	Α	carbon
	В	hydrogen
	С	oxygen
	D	nitrogen

5 The diagrams show the cross-section of three blood vessels, not drawn to the same scale.



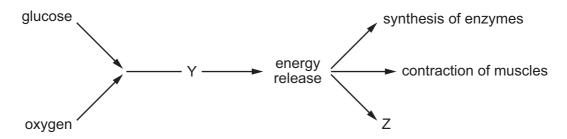
What are these vessels?

	1	2	3
Α	artery	capillary	vein
В	artery	vein	capillary
С	capillary	artery	vein
D	capillary	vein	artery

6 Under which conditions will transpiration from a plant be fastest?

	temperature	humidity
Α	high	high
В	high	low
С	low	high
D	low	low

7 The diagram shows what happens to glucose in the body.



What are processes Y and Z?

	Υ	Z
Α	photosynthesis	growth
В	photosynthesis	respiration
С	respiration	growth
D	respiration	photosynthesis

8 When a person was walking or running, the following measurements were taken.

speed /km perhour	number of breaths per minute	volume of each breath/dm ³
4	16	1
6	18	2
8	20	3

How many dm³ of air did the person breathe per minute when running at 6 km per hour?

- **A** 18
- **B** 36
- **C** 60
- **D** 108

- **9** What 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 constant
 - **D** producing adrenaline in the adrenal glands
- **10** What is a characteristic of human hormones?
 - A destroyed by endocrine glands
 - B made by target organs
 - **C** produced in the liver
 - **D** transported in blood plasma

11 A student placed four sets of seeds in different conditions.

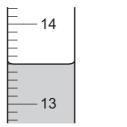
Which set of conditions must be kept constant to show the effect of temperature on germination?

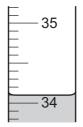
- **A** temperature and water only
- **B** temperature only
- **C** temperature, water and oxygen
- **D** water and oxygen only
- **12** Which statement about asexual reproduction is correct?
 - **A** It involves the formation of diploid zygotes.
 - **B** It involves the formation of haploid zygotes.
 - **C** It produces offspring which are genetically dissimilar.
 - **D** It produces offspring which are genetically identical.
- 13 In some countries, deforestation has taken place in large areas.

What effect would this be likely to have on the environment?

- A decreased carbon dioxide in the atmosphere
- B decreased risk of flooding
- C extinction of local species
- **D** increased use of fossil fuels

14 The diagram shows the readings on a thermometer before and after a reaction.





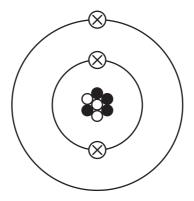
before the reaction

after the reaction

Which row shows the readings on the thermometer?

	before the reaction	after the reaction
Α	13.5	34.1
В	13.5	35.9
С	14.5	34.1
D	14.5	35.9

15 The diagram represents the structure of a lithium atom.



Which particle is represented by \otimes ?

- A electron
- **B** neutron
- C nucleus
- **D** proton

16 Three minerals containing iron are listed.

mineral	chemical formula
goethite	FeO(OH)
magnetite	Fe ₃ O ₄
siderite	FeCO₃

What is the total number of different elements contained in all three minerals?

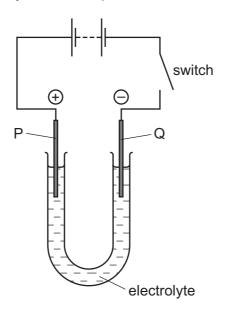
A 3

B 4

C 5

D 16

17 The diagram shows the electrolysis of a compound.



When the switch is closed, the solution around electrode P turns orange because a halogen is formed.

The positive electrode P is called the1....., and the halogen is2.....

Which words complete gaps 1 and 2?

	1	2
Α	anode	bromine
В	anode	chlorine
С	cathode	bromine
D	cathode	chlorine

- 18 Which statement about chemical reactions is correct?
 - A Endothermic reactions result in a temperature decrease.
 - **B** Endothermic reactions result in a temperature increase.
 - **C** Exothermic reactions always produce a large temperature rise.
 - **D** Exothermic reactions always produce a small temperature rise.
- **19** In a manned spacecraft, carbon dioxide is removed from the air by reacting with potassium hydroxide.

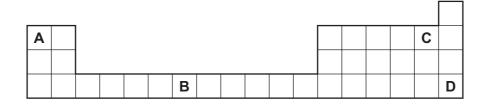
Which type of reaction occurs?

- A decomposition
- **B** neutralisation
- **C** precipitation
- **D** redox
- 20 Which test and result show that a fertiliser contains nitrate ions?

	test	result
A	warm with aqueous sodium hydroxide	gas turns litmus blue
В	warm with aqueous sodium hydroxide	gas turns litmus red
С	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus blue
D	warm with aqueous sodium hydroxide, then add aluminium metal	gas turns litmus red

21 The diagram shows part of the Periodic Table.

Which letter shows the position of a metal with a low melting point?



22 A green halogen gas is bubbled through a potassium halide solution.

The potassium halide solution turns brown-black.

What is the halogen and what is the potassium halide solution?

	halogen	potassium halide solution
Α	bromine	potassium chloride
В	bromine	potassium iodide
С	chlorine	potassium bromide
D	chlorine	potassium iodide

23 Which row describes the general properties of non-metals?

	melting point	density	electrical conductivity
Α	high	low	no
В	low	high	no
С	low	low	no
D	low	low	yes

24 Copper is extracted in process X by heating copper oxide with substance Y.

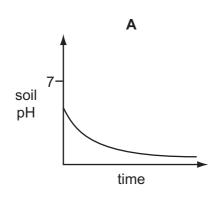
What is process X and what is substance Y?

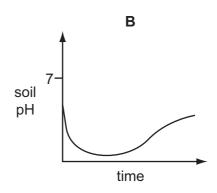
	process X	substance Y
Α	oxidation	carbon
В	oxidation	limestone
С	reduction	carbon
D	reduction	limestone

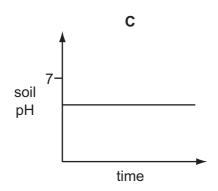
25 Which gas emitted from a car exhaust contributes to acid rain?

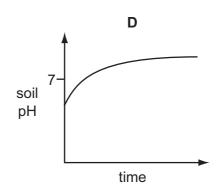
- A carbon monoxide, CO
- B nitrogen, N₂
- C nitrogen monoxide, NO
- **D** water vapour, H₂O

26 Which graph shows how the pH of soil changes when lime is added?









27 Organic molecule X has the following properties.

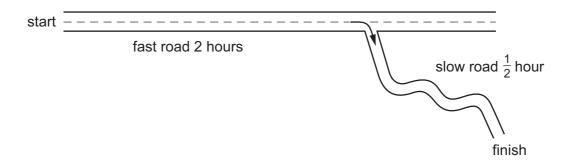
- Complete combustion produces carbon dioxide and water.
- It decolourises aqueous bromine water.
- It is produced by cracking.

What is X?

- A ethane
- **B** ethene
- **C** ethanol
- **D** poly(ethene)

28 A motorist travels 200 km.

After travelling along a fast road for 2 hours, the motorist uses a slow road for the remaining $\frac{1}{2}$ hour of the journey.

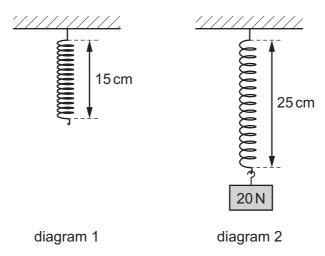


What is the average speed of the car for the whole journey?

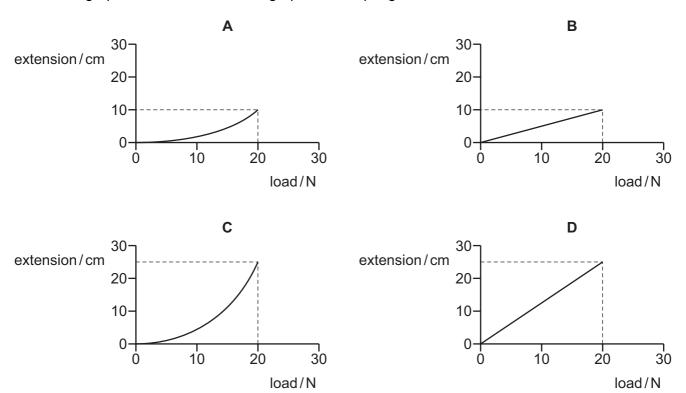
- **A** 80 km/h
- **B** 100 km/h
- **C** 400 km/h
- **D** 500 km/h

29 Diagram 1 shows a spring with its length indicated. Diagram 2 shows the same spring with a 20 N load hung from it, and the new length of the spring.

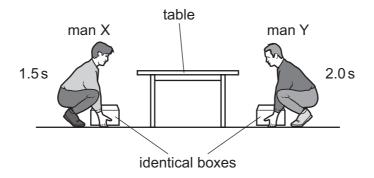
The extension of the spring is directly proportional to the load hung on it.



Which graph is the extension/load graph for the spring?



30 Two men each lift identical boxes vertically upwards onto the same table. Man X takes 1.5s to lift his box, and man Y takes 2.0s to lift his box.



Which man produces the greatest power in lifting the box and what is the unit of power?

	man producing greatest power	unit of power
Α	man X	joule
В	man X	watt
С	man Y	joule
D	man Y	watt

- 31 Which statement describes the properties of a liquid?
 - **A** It has a definite shape and has a definite volume.
 - **B** It has a definite shape but no definite volume.
 - **C** It has no definite shape and no definite volume.
 - **D** It has no definite shape but has a definite volume.
- **32** A substance is a gas when its temperature is 65 °C.

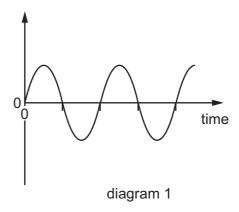
How do the boiling point and the melting point of this substance compare with 65°C?

	boiling point	melting point
Α	above 65 °C	above 65°C
В	above 65 °C	below 65°C
С	below 65°C	above 65 <i>°</i> C
D	below 65°C	below 65°C

33 Which method of thermal energy transfer can occur in a vacuum and which region of the electromagnetic spectrum is often involved in this type of thermal energy transfer?

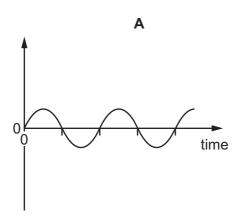
	method of thermal energy transfer	region of the electromagnetic spectrum
Α	convection	infra-red
В	convection	radio waves
С	radiation	infra-red
D	radiation	radio waves

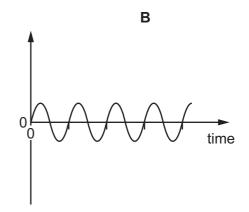
34 Diagram 1 represents a wave.

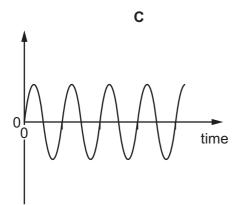


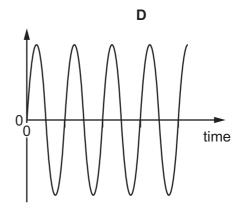
Which diagram below represents a wave with double the frequency and half the amplitude of the wave in diagram 1?

The scales are the same in all the diagrams.

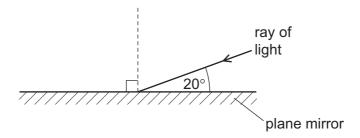








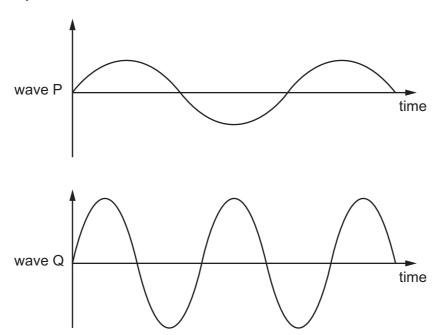
35 The diagram shows a ray of light striking a plane mirror.



What is the angle of reflection?

- **A** 20°
- **B** 40°
- **C** 70°
- **D** 140°

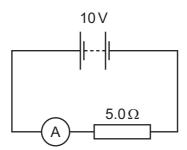
36 The diagrams represent two different sound waves, P and Q, drawn to the same scale.



How do the loudness and the pitch of the sounds compare with each other?

	louder sound	higher pitched sound
Α	Р	Р
В	Р	Q
С	Q	Р
D	Q	Q

37 A 10 V battery is connected in series with an ammeter and a 5.0Ω resistor.



What is the reading on the ammeter?

- **A** 0.20 A
- **B** 0.50 A
- **C** 2.0 A
- **D** 5.0 A

38 A fuse is a safety device for use in an electrical appliance.

How does a fuse affect a circuit when the current in it becomes higher than the rated value for the fuse?

- A It completely stops the current.
- **B** It reduces the current to the rated value for the fuse.
- **C** It reduces the thermal insulation around the wires.
- **D** It sends the current to the outer case of the appliance.

39 Which row shows how lamps are connected in a lighting circuit and gives an advantage of connecting them in this way?

	how lamps are connected	advantage of connecting them in this way
Α	in parallel	they can be switched separately
В	in parallel	they share the voltage
С	in series	they can be switched separately
D	in series	they share the voltage

40 Which row describes the properties of β -particles (beta-particles)?

	they are electromagnetic waves	they are ionising	
Α	✓	✓	key
В	✓	X	✓= yes
С	×	✓	x = no
D	X	x	

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The Periodic Table of Elements

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							- I										2 I
				Key			hydrogen 1										helium 4
	4		a	atomic number		_						5	9	7	80	6	10
	Be		atol	atomic symbo	loc							Ф	ပ	z	0	ш	Ne
lithium 7	beryllium 9		relat	name relative atomic mass	SS							boron 11	carbon 12	nitrogen 14	oxygen 16	fluorine 19	neon 20
_	12											13	14	15	16	17	18
a	Mg											Αl	S	۵	S	Cl	Ā
sodium 23	magnesium 24											aluminium 27	silicon 28	phosphorus 31	sulfur 32	chlorine 35.5	argon 40
	20	21	22	23		25		27	28	29	30	31	32	33	34	35	36
	Ca	လွ	F	>		Mn		ဝိ	Z	Cn	Zu	Ga	Ge	As	Se	Ä	궃
sium 9	calcium 40	scandium 45	titanium 48	vanadium 51		manganese 55		cobalt 59	nickel 59	copper 64	zinc 65	gallium 70	germanium 73	arsenic 75	selenium 79	bromine 80	krypton 84
	38	39	40	41		43		45	46	47	48	49	50	51	52	53	54
٩	S	>	Zr	qN	Mo	ည	Ru	뫈	Pd	Ag	g	In	Sn	Sp	<u>a</u>	П	Xe
mn .c	strontium 88	yttrium 89	zirconium 91	niobium 93	molybdenum 96	technetium -	ruthenium 101	rhodium 103	palladium 106	silver 108	cadmium 112	indium 115	tin 119	antimony 122	tellurium 128	iodine 127	xenon 131
10	99	57–71	72	73	74	75	9/	77	78	6/	80	81	82	83	84	85	98
S	Ba	lanthanoids	Ξ	Б	>	Re	SO	'n	Ŧ	Au	Hg	1L	В	Ξ	Ъо	At	R
caesium 133	barium 137		hafnium 178	tantalum 181	tungsten 184	rhenium 186	osmium 190	indium 192	platinum 195	gold 197	mercury 201	thallium 204	lead 207	bismuth 209	molod	astatine -	radon -
	88	89–103	104	105	106	107	108	109	110	111	112		114		116		
_	Ва	actinoids	꿆	Q O	Sg	뭠	ΗS	Ħ	Ds	Rg	ű		Εl				
francium	radium		rutherfordium	dubnium	seaborgium	bohrium	hassium	meitnerium	damstadtium	roentgenium	copernicium		flerovium		livermorium		
	ı							ı					1	_			

71	lutetium 175	103	ئ	lawrencium -
° X	ytterbium 173	102	%	nobelium –
69 Tm	thulium 169	101	Md	mendelevium –
88 7	erbium 167	100	Fm	fermium -
67 CH	holmium 165	66	Es	einsteinium -
° 2	dysprosium 163	86	ర్	californium –
65 Th	terbium 159	26	嚴	berkelium -
Gd	gadolinium 157	96	Cm	curium —
63 F.1	europium 152	92	Am	americium –
Sm.	samarium 150	94	Pu	plutonium –
e1 Pm	promethium -	93	d	neptunium -
09 V	neodymium 144	92	\supset	uranium 238
59 P	praseodymium 141	91	Ра	protactinium 231
88 C	cerium 140			thorium 232
57	lanthanum 139	89	Ac	actinium _
lanthanoids			actinoids	

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