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**Cambridge International Examinations** Cambridge International General Certificate of Secondary Education (9–1)

## **CO-ORDINATED SCIENCES**

Paper 1 Multiple Choice (Core) SPECIMEN PAPER 0973/01 For Examination from 2019

45 minutes

Additional Materials: M

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.

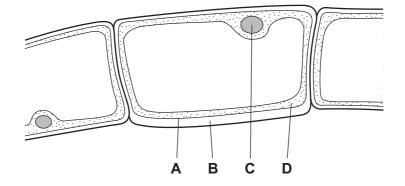
Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet. A copy of the Periodic Table is printed on page 16. Electronic calculators may be used.

This document consists of **16** printed pages.

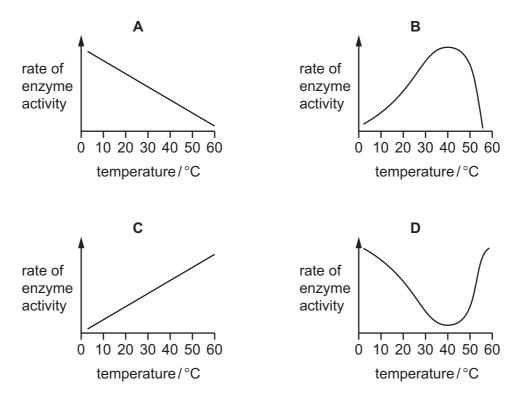


1 The diagram shows cells from an organism seen under a light microscope.

Which part shows that the organism must be a plant?



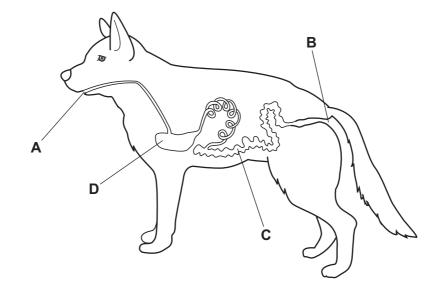
2 Which graph shows the effect of temperature on the rate of enzyme activity within the human body?



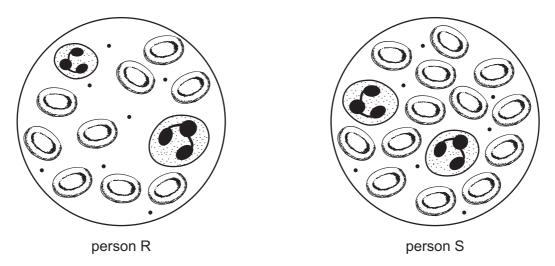
- 3 In a balanced diet, which constituents provide most energy?
  - A carbohydrate and protein
  - **B** fat and carbohydrate
  - C fat and fibre
  - **D** vitamins and protein

4 The diagram shows the alimentary canal of a dog.

Where does egestion occur?



**5** The diagram shows identical volumes of samples of blood as seen under a microscope. The samples are taken from two different people.



Compared with the blood of person R, the blood of person S can

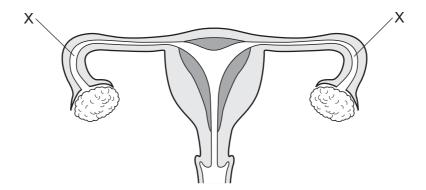
- **A** carry out more phagocytosis.
- **B** clot more easily.
- **C** produce more antibodies.
- **D** transport more oxygen.

- 6 Which process in living organisms does **not** use energy from respiration?
  - A growth
  - **B** muscle contraction
  - **C** photosynthesis
  - **D** temperature maintenance
- 7 A person touches a hot object which triggers a reflex action.

In which order does the impulse travel in the reflex arc?

- **A** receptor  $\rightarrow$  sensory neurone  $\rightarrow$  stimulus
- **B** relay neurone  $\rightarrow$  spinal cord  $\rightarrow$  sensory neurone
- **C** sensory neurone  $\rightarrow$  relay neurone  $\rightarrow$  motor neurone
- D stimulus  $\rightarrow$  motor neurone  $\rightarrow$  spinal cord
- 8 Which of these processes best describes homeostasis?
  - **A** breathing faster after exercise
  - **B** keeping internal conditions in the body constant
  - **C** preventing the body from getting too hot
  - D removing of carbon dioxide from the lungs
- **9** Pollination is the transfer of pollen
  - **A** from anther to sepal.
  - **B** from anther to stigma.
  - **C** from sepal to anther.
  - **D** from stigma to anther.

**10** The diagram shows the female reproductive system.



Sometimes the tubes at X become blocked.

What effect does this have?

- **A** Eggs cannot reach the uterus.
- **B** Menstruation is prevented.
- **C** Ovulation is prevented.
- **D** Sperm cannot reach the uterus.
- 11 In mice, the allele for black fur is dominant to the allele for white fur. Two heterozygous mice mate.

What colour are the offspring likely to be?

- A all black
- B all grey
- c all white
- D some black and some white
- 12 In the carbon cycle, which process releases the most carbon dioxide into the atmosphere?
  - A combustion
  - **B** feeding
  - C fossilisation
  - **D** photosynthesis

	build-up of atmospheric carbon dioxide	increased number of habitats	loss of soil	
Α	×	$\checkmark$	×	Key
в	$\checkmark$	$\checkmark$	×	✓ yes
С	✓	×	$\checkmark$	× no
D	×	×	$\checkmark$	

13 Which row shows more than one result of deforestation?

**14** Hydrogen can occur as an atom, an ion and a molecule.

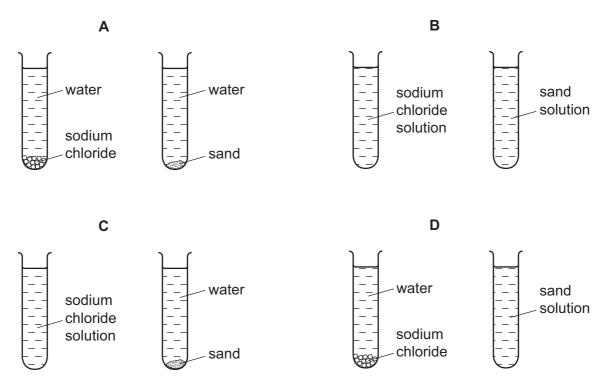
Which row in the table represents these particles?

	atom	ion	molecule
Α	Н	H+	H <sub>2</sub>
в	Н	H <sub>2</sub>	H⁺
С	H <sup>+</sup>	н	H <sub>2</sub>
D	H <sub>2</sub>	H+	Н

**15** Small amounts of sodium chloride and sand are shaken with separate samples of water in two test-tubes. The test-tubes are left to stand for 24 hours.

6

Which diagram shows how the test-tubes appear after leaving them to stand for 24 hours?



**16** Magnesium chloride is soluble in water. Barium sulfate is insoluble in water.

Which processes are used to obtain crystals of magnesium chloride from a mixture of magnesium chloride and barium sulfate in water?

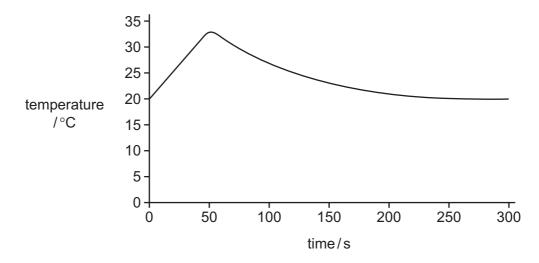
	first stage	second stage
Α	crystallise	neutralise
В	evaporate	filter
С	filter	dissolve
D	filter	evaporate

**17** When dilute sulfuric acid is electrolysed using inert electrodes, two gases are produced.

What are these two gases?

- A hydrogen and oxygen
- B hydrogen and sulfate
- **C** hydrogen and sulfur dioxide
- D oxygen and sulfur dioxide
- 18 When sodium hydroxide and hydrochloric acid are mixed, they react immediately.

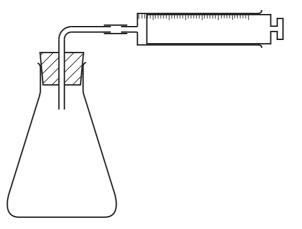
The graph shows how the temperature of the mixture changes over time.



Which type of chemical reaction takes place?

- A both endothermic and exothermic
- B endothermic
- **C** exothermic
- D neither endothermic nor exothermic

**19** The apparatus below is used to investigate the rate of a chemical reaction.



For which reaction is the apparatus used to investigate the rate of the reaction?

- **A** gas E + gas F  $\rightarrow$  liquid G
- **B** solid H + solution I  $\rightarrow$  solution J
- $\textbf{D} \quad \text{solution } \mathsf{P} + \text{solution } \mathsf{Q} \ \rightarrow \ \text{solid} \ \mathsf{R} + \text{solution } \mathsf{Q}$
- 20 The elements from sodium to sulfur, shown below, are in the same period of the Periodic Table.

Na Mg A <i>l</i> Si P S
-------------------------

Which trend does not occur across the Periodic Table from sodium to sulfur?

- **A** The chlorides of the elements change from covalent to ionic.
- **B** The elements change from good to poor electrical conductors.
- **C** The oxides of the elements change from basic to acidic.
- **D** The solid elements change from malleable to brittle.
- **21** Elements X, Y and Z are similar elements.

They are soft and they react vigorously with water to produce hydrogen.

Where in the Periodic Table are X, Y and Z found?

- A Group I
- **B** Transition elements
- C Group VII
- D Group VIII

**22** The table shows information about some minerals.

mineral	chemical formula
bauxite	$Al_2O_3$
galena	PbS
hematite	Fe <sub>2</sub> O <sub>3</sub>
rutile	TiO <sub>2</sub>

Which minerals contain a transition element?

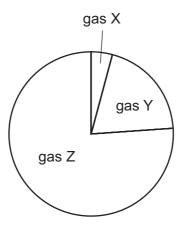
- **A** bauxite and galena
- B bauxite and hematite
- **C** galena and rutile
- **D** hematite and rutile
- **23** A cup is made of copper.

Why is the cup **not** used for hot drinks?

- **A** Copper is a good conductor of heat.
- **B** Copper is a good electrical conductor.
- **C** Copper is brightly coloured.
- **D** Copper is malleable.
- 24 Why is chlorine used in the treatment of the water supply?
  - **A** to improve the taste
  - B to kill microorganisms
  - **C** to neutralise acids
  - **D** to remove solids

**25** Air is a mixture of gases.

The diagram shows the composition of clean air.



What are gases X, Y and Z?

	gas X	gas Y	gas Z
Α	N <sub>2</sub>	0 <sub>2</sub>	noble gases, CO <sub>2</sub> , H <sub>2</sub> O
в	noble gases, CO <sub>2</sub> , H <sub>2</sub> O	N <sub>2</sub>	0 <sub>2</sub>
С	noble gases, CO <sub>2</sub> , H <sub>2</sub> O	0 <sub>2</sub>	N <sub>2</sub>
D	0 <sub>2</sub>	noble gases, CO <sub>2</sub> , H <sub>2</sub> O	N <sub>2</sub>

**26** A fuel used for cooking food is the hydrocarbon .....1..... that burns in an .....2..... reaction. Which phrases correctly complete gaps 1 and 2?

	1	2
Α	ethanol, C <sub>2</sub> H <sub>5</sub> OH	endothermic
В	ethanol, C <sub>2</sub> H <sub>5</sub> OH	exothermic
С	methane CH <sub>4</sub>	endothermic
D	methane CH <sub>4</sub>	exothermic

**27** The hydrocarbon dodecane has the formula  $C_{12}H_{26}$ .

A reaction of dodecane produces small alkene molecules.

What is the name of this process?

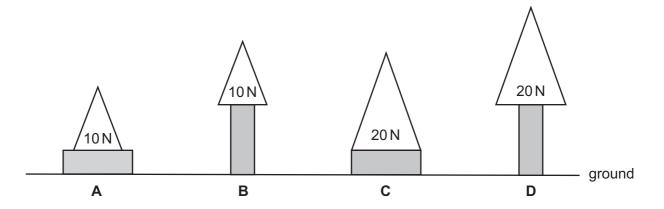
- **A** cracking
- **B** distillation
- **C** evaporation
- D fractional distillation

**28** The circuit of a motor racing track is 3.0 km in length. In a race, a car goes 25 times round the circuit in 30 minutes.

What is the average speed of the car?

- A 75 km/hour
- **B** 90 km/hour
- C 150 km/hour
- D 750 km/hour
- **29** The diagrams show different weights resting on wooden blocks. All the wooden blocks have the same dimensions and weight.

In which diagram is the greatest pressure exerted on the ground?

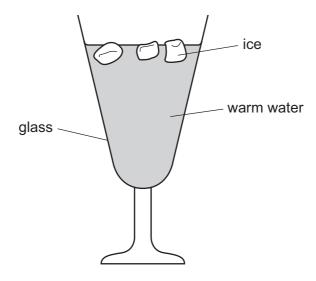


- 30 What is the source of the energy converted by a hydroelectric power station?
  - A chemical energy of oil
  - B gravitational potential energy of water
  - **C** kinetic energy of waves
  - D thermal energy of hot rocks
- 31 Molecules escape from a liquid as it evaporates.

Which row in the table describes the energy of the molecules that escape and the effect on the temperature of the remaining liquid?

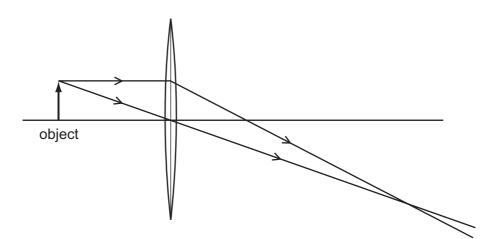
	molecules that escape	effect on temperature of remaining liquid
Α	high energy	decreases
В	high energy	increases
С	low energy	decreases
D	low energy	increases

32 The diagram shows some ice being used to lower the temperature of some warm water.



What is the main process by which the water at the bottom of the glass becomes cool?

- A condensation
- **B** conduction
- **C** convection
- D radiation
- **33** The diagram shows two rays of light passing through a converging lens.



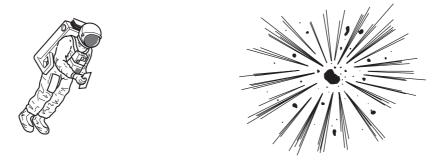
Which type of image is formed?

- A inverted and larger than the object
- **B** inverted and smaller than the object
- **C** upright and larger than the object
- **D** upright and smaller than the object

**34** Which row shows how the speed and the wavelength of microwaves compare with the speed and the wavelength of X-rays?

	speed of microwaves	wavelength of microwaves
Α	less than X-rays	greater than X-rays
В	less than X-rays	less than X-rays
С	the same as X-rays	greater than X-rays
D	the same as X-rays	less than X-rays

**35** An explosion experiment is carried out on Earth. The experiment is repeated by an astronaut in space where there is no gas or air.



How does the explosion sound to the astronaut in space?

- **A** slightly louder than on Earth
- **B** the same loudness as on Earth
- **C** slightly quieter than on Earth
- D completely silent
- **36** A student makes a permanent magnet using a piece of metal and a magnetising coil.

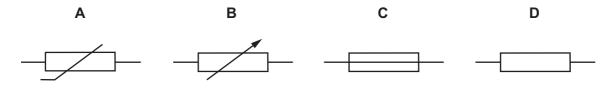
Which metal should she use?

- **A** aluminium
- **B** copper
- **C** iron
- D steel

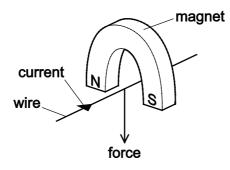
**37** A polythene rod repels an inflated balloon hanging from a nylon thread.

Why do the rod and balloon repel?

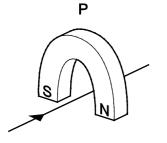
- **A** The rod and the balloon have opposite charges.
- **B** The rod and the balloon have like charges.
- **C** The rod is charged but the balloon is not.
- **D** The balloon is charged but the rod is not.
- 38 What is the symbol for a fuse?



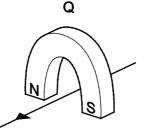
**39** A wire is placed between the poles of a horseshoe magnet. There is a current in the wire in the direction shown, and this causes a force to act on the wire.



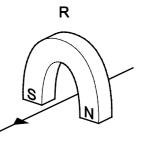
Three other arrangements P, Q and R of the wire and magnet are set up as shown.



magnet turned around



current direction reversed



current direction reversed and magnet turned around

Which arrangement or arrangements will cause a force in the same direction as the original arrangement?

- **A** P, Q and R
- B P and Q only
- C P only
- D R only

**40** A powder contains 2.4 g of a radioactive isotope.

The half-life of the isotope is 2.0 days.

What mass of this isotope remains after 6.0 days?

- **A** 0g
- **B** 0.30 g
- **C** 0.80 g
- **D** 1.2g

	VIII	<sup>2</sup> He <sup>helium</sup>	10	Ne	neon 20	18	Ar	argon 40	36	Ϋ́	krypton 84	54	Xe	xenon 131	86	Rn	radon -										
	VII		6	ш	fluorine 19	17	Cl	chlorine 35.5	35	Ъ	bromine 80	53	Ι	iodine 127	85	At	astatine -				-	71	Lu	Iutetium 175	103	Ļ	lawrencium -
	٨		80	0	oxygen 16	16	S	sulfur 32	34	Se	selenium 79	52	Тe	tellurium 128	84	Ъо	polonium –	116	۲<	livermorium -	-	70	Υb	ytterbium 173	102	No	nobelium -
	>		7	z	nitrogen 14	15	۵.	phosphorus 31	33	As	arsenic 75	51	Sb	antimony 122	83	<u>.</u>	bismuth 209					69	T	thulium 169	101	Md	mendelevium -
	N		9	U	carbon 12	14	N.	silicon 28	32	Ge	germanium 73	50	Sn	tin 119	82	РЬ	lead 207	114	Fl	flerovium -		68	ц	erbium 167	100	ЕЛ	fermium -
			5	ш	boron 11	13	Ρl	aluminium 27	31	Ga	gallium 70	49	In	indium 115	81	$\Gamma l$	thallium 204					67	Ю	holmium 165	66	Es	einsteinium -
									30	Zn	zinc 65	48	Cq	cadmium 112	80	Hg	mercury 201	112	C	copernicium -		66	D	dysprosium 163	98	Ç	californium -
									29	Cu	copper 64	47	Ag	silver 108	79	Au	gold 197	111	Rg	roentgenium -				terbium 159		Ŗ	berkelium -
dn									28	Ī	nickel 59	46	Ъd	palladium 106	78	Ъ	platinum 195	110	Ds	darmstadtium -		64	Ъд	gadolinium 157	96	С С	curium -
Group									27	ပိ	cobalt 59	45	Rh	rhodium 103	17	Г	iridium 192	109	Mt	meitnerium -		63	Eu	europium 152	95	Am	americium -
		hydrogen 1							26	Fе	iron 56	44	Ru	ruthenium 101	76	Os	osmium 190	108	Hs	hassium -		62	Sm	samarium 150	94	Pu	plutonium –
			1						25	Mn	manganese 55	43	Ц	technetium -	75	Re	rhenium 186	107	Bh	bohrium –		61	Pm	promethium -	93	Np	neptunium -
				pol	ISS				24	ŋ	chromium 52	42	Mo	molybdenum 96	74	×	tungsten 184	106	Sg	seaborgium -		60	PN	neodymium 144			uranium 238
		Key	atomic number	atomic symbol	name relative atomic mass				23	>	vanadium 51	41	qN	niobium 93	73	Та	tantalum 181	105	Db	dubnium –		59	Pr	praseodymium 141	91	Ра	protactinium 231
				ato	rela				22	Ħ	titanium 48	40	Zr	zirconium 91	72	Hf	hafnium 178	104	Ъf	rutherfordium 		58	0e			Th	thorium 232
			_						21	Sc	scandium 45	39	≻	yttrium 89	57-71	lanthanoids		89-103	actinoids			57	La	lanthanum 139	89	Ac	actinium -
	=		4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	S	strontium 88	56	Ba	barium 137	88	Ra	radium -			ids				
	_		ю	:	lithium 7	11	Na	sodium 23	19	X	potassium 39	37	Rb	rubidium 85	55	S	caesium 133	87	ŗ	francium -			lanthanoids			actinoids	

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