Cambridge Assessment

Cambridge IGCSE[™]

CO-ORDINATED SCIENCES

Paper 1 Multiple Choice (Core)

0654/12 May/June 2024 45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet Soft clean eraser Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- 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 multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

- 1 Which two characteristics of living organisms are demonstrated by gravitropism?
 - A growth and nutrition
 - **B** growth and sensitivity
 - **C** respiration and nutrition
 - D respiration and sensitivity
- 2 By which process does oxygen pass from the alveoli to the blood capillaries in the lungs?
 - A diffusion
 - **B** osmosis
 - **C** secretion
 - **D** transpiration
- 3 What are the products when oils are digested?
 - A amino acids and glycerol
 - B fats and amino acids
 - **C** fatty acids and glycerol
 - D fatty acids and sugars
- 4 The diagram shows part of the human alimentary canal and associated organs.



Which labels identify the liver, pancreas and stomach?

	liver	pancreas	stomach					
Α	2	1	3					
в	2	3	1					
С	4	2	3					
D	4	2	1					

5 The diagram shows the cross-section of part of a leaf with cells labelled W, X, Y and Z.



Which cells lose most water and which cells absorb most carbon dioxide during the daytime?

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

6 A scientist places equal volumes of starch and saliva into a test-tube.

After 30 minutes, the mixture in the test-tube is tested with iodine solution.

The iodine solution remains brown.

Which process does this experiment demonstrate?

- A absorption
- **B** assimilation
- **C** digestion
- **D** ingestion
- 7 The diagram shows some blood viewed under a light microscope.



How many red blood cells are shown?

A 1 **B** 2 **C** 5 **D** 7

- 8 Which statement about the composition of expired air, compared with inspired air, is correct?
 - A The percentage of carbon dioxide is decreased and the percentage of water vapour is increased.
 - **B** The percentage of carbon dioxide is increased and the percentage of water vapour is increased.
 - **C** The percentage of oxygen is decreased and the percentage of carbon dioxide is decreased.
 - **D** The percentage of oxygen is increased and the percentage of carbon dioxide is decreased.
- 9 Which row about hormones is correct?

	means of transport	where produced	site of action
Α	alimentary canal	glands	target organs
в	alimentary canal	organs	all organs
С	blood	glands	target organs
D	blood	organs	all organs

10 The diagram shows the human female reproductive system.

Where is the embryo normally implanted to enable it to develop into a healthy fetus?



- **11** Which statement describes a heterozygous genotype?
 - A not pure breeding with two different alleles
 - **B** not pure breeding with two identical alleles
 - **C** pure breeding with two different alleles
 - **D** pure breeding with two identical alleles

- **12** Which statement about organisms in a food chain is correct?
 - **A** A carnivore is an organism that gets its energy by eating plants.
 - **B** A consumer is an organism that gets its energy by eating other organisms.
 - **C** A herbivore is an organism that gets its energy by eating animals.
 - **D** A producer is an organism that gets its energy from dead or waste matter.
- **13** The diagram shows gas exchange by two groups of organisms during the hours of darkness.



Which letters represent gases that are part of the carbon cycle?

 A
 P and Q
 B
 P and R
 C
 P and S
 D
 Q and S

- **14** Which statement about atoms is correct?
 - **A** All atoms contain equal numbers of neutrons and protons.
 - **B** All atoms of the same element have the same number of neutrons.
 - **C** The Periodic Table lists atoms in order of increasing mass number.
 - **D** The smallest unit of an element is an atom.

15 Which substances exist as covalent molecules?

- 1 helium
- 2 chlorine
- 3 sodium chloride
- 4 ethanol
- **A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

6

16 Which diagram shows the structure of graphite?



17 Which oxides of nitrogen have the same ratio of nitrogen atoms to oxygen atoms?



18 Hydrogen gas is given off when zinc reacts with dilute sulfuric acid.

Which piece of apparatus is used to collect the hydrogen gas and measure its volume?

A balance

Α

- B gas syringe
- **C** pipette
- D test-tube
- **19** The equation for the reaction between iron(III) oxide, Fe_2O_3 , and carbon is shown.

 $2Fe_2O_3 \ \text{+} \ 3C \ \rightarrow \ 4Fe \ \text{+} \ 3CO_2$

Which statement about this reaction is correct?

- A C is oxidised.
- **B** CO₂ is reduced.
- C Fe is oxidised.
- \mathbf{D} Fe₂O₃ is oxidised.

20 The waste from a factory is acidic. The factory treats the waste with limestone.

Which row shows the pH of the waste before and after treatment?

	before	after
Α	6	5
в	6	7
С	8	7
D	8	9

21 White solid X reacts with dilute hydrochloric acid. A gas is produced which turns limewater milky.

A flame test is done on solid X and produces a red coloured flame.

What is X?

- A lithium carbonate
- B lithium chloride
- **C** potassium carbonate
- D potassium chloride
- 22 Different minerals contain different elements.

Which mineral contains three non-metallic elements?

	mineral	formula
Α	chalcopyrite	CuFeS₂
В	cryolite	Na_3AlF_6
С	gypsum	CaSO ₄ •2H ₂ O
D	ilmenite	FeTiO₃

23 Manganese is a transition element.

What is a property of manganese?

- A high melting point
- B low density
- **C** thermal insulator
- D transparent

- 24 Which process is used to increase the hardness of a metal?
 - A Mix the metal with a gas.
 - **B** Mix the metal with another element.
 - **C** Mix the metal with a polymer.
 - D Mix the metal with its ore.
- 25 Which compound contains two of the three elements needed in a fertiliser used for plant growth?
 - A potassium carbonate
 - **B** potassium chloride
 - **C** potassium nitrate
 - D potassium sulfate
- 26 Which type of reaction is used to manufacture lime from limestone?
 - A addition polymerisation
 - **B** cracking
 - **C** neutralisation
 - **D** thermal decomposition
- 27 Poly(ethene) is made from ethene by addition polymerisation.

Which word describes ethene in this process?

- A fuel
- B catalyst
- **C** monomer
- D solvent

28 The graph shows how the speed of an object varies with time.

The speed of the object is v at time t.



Which expression gives the distance travelled by the object in time *t*?



29 The diagram shows a block of metal of mass 72 g.



What is the density of the metal?

A 3.0 g/cm^3 **B** 6.0 g/cm^3 **C** 9.0 g/cm^3 **D** 12 g/cm^3

- **30** Which statement about a resultant force is correct?
 - **A** An object must have a resultant force acting on it if it is moving.
 - **B** An object must have a resultant force acting on it if it is slowing down.
 - **C** Two forces must be in the same direction to produce a resultant force.
 - **D** Two forces must have the same magnitude to produce a resultant force.
- **31** What is the energy source for a wind turbine that is producing electricity?
 - A chemical potential energy of wind
 - **B** gravitational potential energy of wind
 - C kinetic energy of wind
 - D thermal energy of wind

32 A copper disc has a hole at its centre that is slightly too small to fit over a copper cylinder.



How can the disc be fitted over the cylinder?

- **A** Cool the disc and then fit it over the cylinder.
- **B** Cool the disc, heat the cylinder and then fit the disc over the cylinder.
- **C** Heat the cylinder and then fit it through the hole in the disc.
- **D** Heat the disc and then fit it over the cylinder.
- **33** The diagram shows a ray of light travelling from glass into air.

Which labelled arrow shows the path of the light in the air?



34 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?

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

35 When two different, uncharged, insulating materials are rubbed together, one becomes positively charged and the other becomes negatively charged.

What happens to cause the materials to become charged?

	positively charged material	negatively charged material
Α	gains protons	gains electrons
В	gains protons	loses protons
С	loses electrons	gains electrons
D	loses electrons	loses protons

- 36 For which quantities is the unit the volt?
 - A current and potential difference (p.d.)
 - **B** electromotive force (e.m.f.) and potential difference (p.d.)
 - C electromotive force (e.m.f.) and resistance
 - D potential difference (p.d.) and resistance
- **37** A 2.0 Ω resistor and a 1.0 Ω resistor are connected in series with a cell.



Which statement about current in the circuit is correct?

- **A** The current in the 2.0 Ω resistor is double the current in the 1.0 Ω resistor.
- **B** The current in the 2.0 Ω resistor is equal to the current in the 1.0 Ω resistor.
- **C** The current in the 2.0Ω resistor is half the current in the 1.0Ω resistor.
- **D** The current in the cell is larger than the current in either resistor.
- **38** A coil lies between the poles of a magnet. There is a current in the coil and this causes a turning effect.

Which change does **not** increase the turning effect on the coil?

- A changing the direction of the current
- **B** increasing the current
- C using a stronger magnet
- **D** using more turns in the coil
- 39 An atom of an isotope of strontium (Sr) has a proton number of 38 and contains 52 neutrons.What is the nuclide notation for this isotope?



40 The graph shows the decay curve for a radioactive substance.



What is the half-life of this substance?

- **A** 2.0 hours
- **B** 3.2 hours
- **C** 5.0 hours
- **D** 10 hours

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The Periodic Table of Elements

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	NIII	He ₂	helium 4	10	Ne	neon 20	18	Ar	argon 40	36	Ϋ́	krypton 84	54	Xe	xenon 131	86	Rn	radon -	118	0g	oganesso –									
	IIV			6	LL	fluorine 19	17	Cl	chlorine 35.5	35	Ъ	bromine 80	53	_	iodine 127	85	At	astatine -	117	Ъ	tennessine -									
	١٨			8	0	oxygen 16	16	ა	sulfur 32	34	Se	selenium 79	52	Те	tellurium 128	84	Ро	polonium –	116	۲<	livermorium –									
	>						7	z	nitrogen 14	15	۵.	phosphorus 31	33	As	arsenic 75	51	Sb	antimony 122	83	Bi	bismuth 209	115	Mc	moscovium -						
	2			9	U	carbon 12	14	Si	silicon 28	32	Ge	germanium 73	50	Sn	tin 119	82	Pb	lead 207	114	Fl	flerovium -									
	≡			5	Ш	boron 11	13	Al	aluminium 27	31	Ga	gallium 70	49	Ľ	indium 115	81	Tl	thallium 204	113	ЧN	nihonium –									
										30	Zn	zinc 65	48	Cd	cadmium 112	80	Hg	mercury 201	112	C	copernicium -									
										29	Cu	copper 64	47	Ag	silver 108	79	Au	gold 197	111	Rg	roentgenium -									
dno										28	ïŻ	nickel 5.9	46	Ъd	palladium 106	78	ħ	platinum 195	110	Ds	darmstadtium -									
Gro										27	ပိ	cobalt 59	45	Rh	rhodium 103	77	<u>_</u>	iridium 192	109	Mt	meitnerium -									
		- T	hydrogen 1							26	Ъe	iron 56	44	Ru	ruthenium 101	76	So	osmium 190	108	Hs	hassium -									
				1						25	Mn	manganese 55	43	Ъс	technetium -	75	Re	rhenium 186	107	Bh	bohrium –									
	Key		bol	ISS				24	ŗ	chromium 52	42	Mo	molybdenum 96	74	×	tungsten 184	106	Sg	seaborgium -											
		Key	Key	Key	atomic numbel	atomic number	atomic number	atomic number	atomic numbe	atomic numbe	atomic numbe	atomic number	mic sym	atomic number mic syml	name tive atomic ma				23	>	vanadium 51	41	qN	niobium 93	73	Та	tantalum 181	105	Db	dubnium –
					ato	rela				22	F	titanium 48	40	Zr	zirconium 91	72	Ť	hafnium 178	104	Ŗ	rutherfordium -									
										21	လိ	scandium 45	39	≻	yttrium 89	57-71	lanthanoids		89-103	actinoids										
	=			4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	ي ا	strontium 88	56	Ba	barium 137	88	Ra	radium -									
	_			ю	:	lithium 7	11	Na	sodium 23	19	×	potassium 39	37	Rb	rubidium 85	55	Cs	caesium 133	87	L L	francium -									



PMT

lawrencium -

mendelevium

71 Lu 175 103 Lr

70 Yterbium 173 102 NO nobelium

69 Tm 101 Md

68 erbium 167 100 Fm fermium

67 holmium 165 99 einsteinium

66 Dy dysprosium 163 98 98 Cf

65 Tb 159 97 97 berkelium

64 Gd 157 157 157 157 -

63 Eu 152 95 95 35 35

62 Sm 150 94 94 Pu Putonium

I

60 leodymium 144 92 92 238 238

59 Praseodymium 141 91 Pa protactinium 231

58 Centum 140 90 90 90 232 232

57 La lanthanum 139 89 89 AC actinium

actinoids

lanthanoids

93 Np Teptunium

61 Promethium

16