

Cambridge IGCSE[™]

PHYSICAL SCIENCE 0652/11

Paper 1 Multiple Choice (Core)

October/November 2022

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.

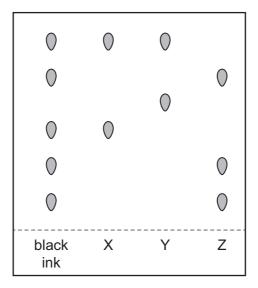
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, 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 The chromatogram of a black ink and three coloured dyes, X, Y and Z, is shown.



Which colours make up the black ink?

- **A** X and Y only **B** X and Z only **C** X, Y and Z **D** Z only
- 2 Which statement about elements, mixtures and compounds is correct?
 - **A** A compound is made into different substances by chemical changes.
 - **B** All mixtures contain three or more substances.
 - **C** All mixtures contain atoms of different elements chemically joined together.
 - **D** Every element contains more than one type of atom.
- **3** Which statement about a proton is correct?
 - **A** It has the same relative charge as an electron.
 - **B** It has approximately the same relative mass as an electron.
 - **C** It has the same relative charge as a neutron.
 - **D** It has approximately the same relative mass as a neutron.
- 4 When atoms of sodium combine with atoms of chlorine, sodium chloride is formed.

How are the bonds between sodium and chlorine formed?

- A Chlorine gives electrons to sodium.
- **B** Sodium and chlorine lose electrons.
- **C** Sodium gives electrons to chlorine.
- **D** Sodium shares electrons with chlorine.

5 Pentane, C_5H_{12} , burns in oxygen.

$$C_5H_{12} + xO_2 \rightarrow 5CO_2 + yH_2O$$

Which values of *x* and *y* balance the equation?

	х	У
Α	4	6
В	4	12
С	8	6
D	8	12

- 6 Which process occurs when an ionic compound is broken down by the passage of electricity?
 - A electrode
 - **B** electrolysis
 - **C** electrolyte
 - **D** electron
- 7 Anhydrous copper(II) sulfate is placed in a test-tube.

When water is added to the test-tube, the temperature changes from 17 °C to 27 °C.

Which type of reaction takes place?

- **A** addition
- **B** endothermic
- **C** exothermic
- **D** oxidation

8 Calcium carbonate reacts with hydrochloric acid.

$$CaCO_3$$
 + $2HCl \rightarrow CaCl_2$ + CO_2 + H_2O

Which row describes how the rate of reaction and the concentration of hydrochloric acid change as the reaction occurs?

	rate of reaction	concentration of hydrochloric acid
Α	decreases	decreases
В	decreases	increases
С	increases	increases
D	increases	decreases

9 The chart shows the colour of universal indicator at different pH values.

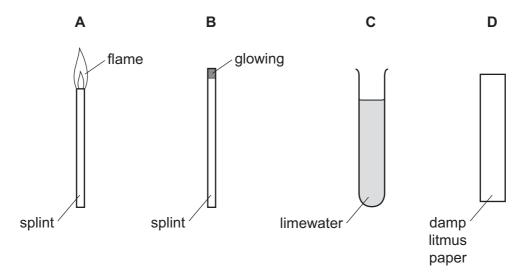
colour	red			orange green						İ	violet			
рН	1	2	3	4	5	6	7	8	9	10	11	12	13	14

A solution of lemon juice is only slightly acidic.

Which colour does universal indicator give with this solution?

- A blue
- **B** orange
- C red
- **D** violet

10 Which test is used to show that a gas is ammonia?

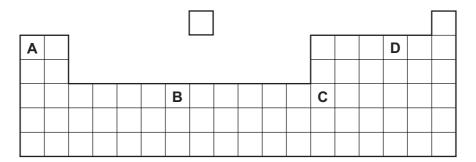


11 Substance X is warmed with excess aqueous sodium hydroxide. A gas is evolved and a colourless solution is obtained.

What is substance X?

- A ammonium sulfate
- **B** copper(II) carbonate
- c iron(II) sulfate
- **D** zinc sulfate
- 12 Part of the Periodic Table is shown.

Which letter shows the position of a non-metal?



- 13 Some properties of an element are listed.
 - high density
 - high melting point
 - forms coloured compounds
 - can act as a catalyst

Where in the Periodic Table is the element placed?

- A Group VIII
- B Group I
- C Group VII
- D transition elements

14 Some reactions of four metals, W, X, Y and Z, and their oxides are shown.

The letters are not the chemical symbols of the metals.

metal	reaction of metal with dilute hydrochloric acid	reaction of metal oxide with carbon
W	reacts	not readily reduced
Х	no reaction	readily reduced
Υ	reacts	reduced
Z	fast reaction	not reduced

What is the order of reactivity of these metals?

	most reactive		-	least reactive
Α	Z	W	Y	X
В	Z	Υ	W	X
С	Х	W	Y	Z
D	X	Υ	W	Z

15 What is the name of the raw material from which aluminium is extracted and what is the method of extraction used?

	name of raw material	method of extraction
Α	bauxite	electrolysis
В	bauxite	reaction with carbon
С	petroleum	electrolysis
D	petroleum	reaction with carbon

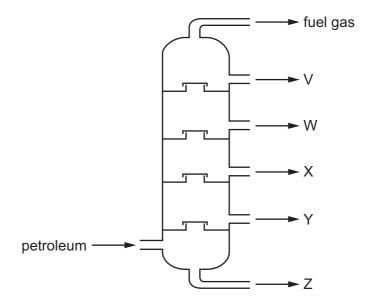
- **16** Which statements about carbon dioxide are correct?
 - 1 It is produced by the reaction between an acid and a metal oxide.
 - 2 It is produced by the reaction of a metal with an acid.
 - 3 It is a greenhouse gas.
 - 4 It is a product of respiration.

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

- 17 Which type of reaction occurs when calcium carbonate is converted into calcium oxide?
 - A cracking
 - **B** displacement
 - **C** neutralisation
 - **D** thermal decomposition
- **18** Which row shows the structure of the named compound?

	name	structure
A	methane	H H H H H H H H H H H H H H H
В	ethane	H—C—H
С	ethene	H H C==C H H
D	ethanol	H H H—C—C—H H H

19 The diagram shows the fractional distillation of petroleum.



Which row shows the correct use for the fraction?

	fraction	use						
Α	V	aircraft fuel						
В	W	making roads						
С	Х	diesel fuel						
D	Z	making polishes and waxes						

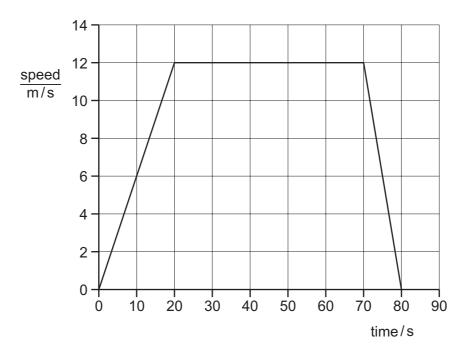
20 Hexane is an alkane. It is a liquid at room temperature.

What are the properties of hexane?

- 1 It burns completely to give carbon dioxide and water.
- 2 It does not decolourise bromine water.
- 3 It is an unsaturated compound.

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

21 The speed–time graph shown is for a bus as it travels from one bus stop to the next.



What is the distance between the two bus stops?

- **A** 120 m
- В 600 m
- **C** 780 m
- 960 m

22 Which quantity has the same unit as force?

- A current
- В energy
- speed C
- weight

23 The mass of an empty beaker is 120 g.

When the beaker contains 50 cm³ of a liquid, the total mass of the beaker and liquid is 160 g.

What is the density of the liquid?

- **A** $0.80 \,\mathrm{g/cm^3}$

- **B** $2.4 \,\mathrm{g/cm^3}$ **C** $3.2 \,\mathrm{g/cm^3}$ **D** $5.6 \,\mathrm{g/cm^3}$

24 The work done by a force acting on an object depends on the magnitude of the force.

In order to calculate the work done, which other quantity must be known?

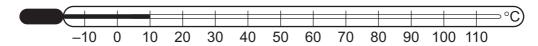
- the distance moved by the object
- the mass of the object В
- the shape of the object C
- the time for which the force acts

25 Different energy resources are used to produce electricity.

Which resource is the least reliable?

- **A** geothermal
- **B** hydroelectric
- **C** nuclear
- **D** wind

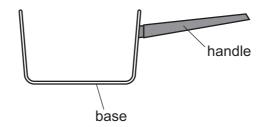
26 A liquid-in-glass thermometer is marked with a scale in °C.



What are the fixed points for this thermometer?

- \mathbf{A} -10 °C and 10 °C
- **B** −10 °C and 110 °C
- C 0°C and 100°C
- **D** 10 °C and 110 °C

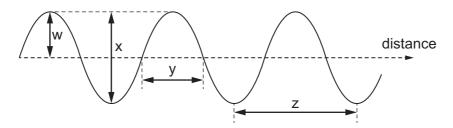
27 The diagram shows a saucepan.



What are suitable thermal conduction properties for the materials used to make the base and the handle?

	base	handle
Α	bad conductor	bad conductor
В	bad conductor	good conductor
С	good conductor	bad conductor
D	good conductor	good conductor

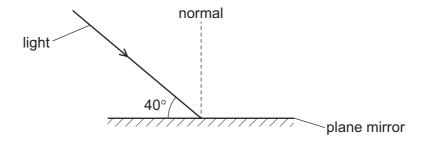
28 The diagram represents a wave.



Which labelled arrows give the amplitude and the wavelength of the wave?

	amplitude	wavelength
Α	w	у
В	w	z
С	x	у
D	Х	Z

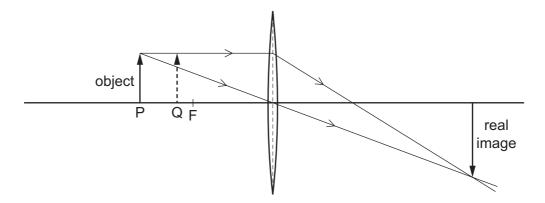
29 Light is incident on a plane mirror at an angle of 40° to the surface.



What is the angle of reflection of the light?

- **A** 40°
- **B** 50°
- **C** 100°
- **D** 140°

30 An object is placed at P, close to a converging lens. The ray diagram shows the formation of the real image. A principal focus of the lens is marked F.



The object is moved from P to Q.

Which row describes what happens to the distance between the image and the lens, and what happens to the size of the image?

	distance between image and lens	size of image
Α	decreases	decreases
В	decreases	increases
С	increases	decreases
D	increases	increases

31 Which electromagnetic radiation is used to show what is inside closed suitcases in airports?

- A infrared
- **B** microwaves
- C radio waves
- **D** X-rays

32 Sound of which frequency is **not** audible to a healthy human ear?

- **A** 5.0 Hz
- **B** 50 Hz
- **C** 500 Hz
- **D** 5000 Hz

33 Which metal is used to make the core of an electromagnet?

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

34 The diagram shows the charges on three objects, P, Q and R.







Which diagram shows the directions of the forces that act on object R?



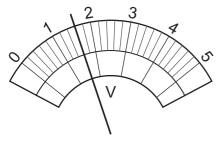


C

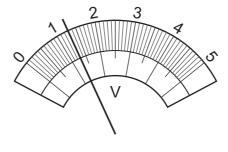
D



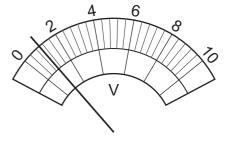
35 The diagrams show the readings on three voltmeters.



meter W



meter X

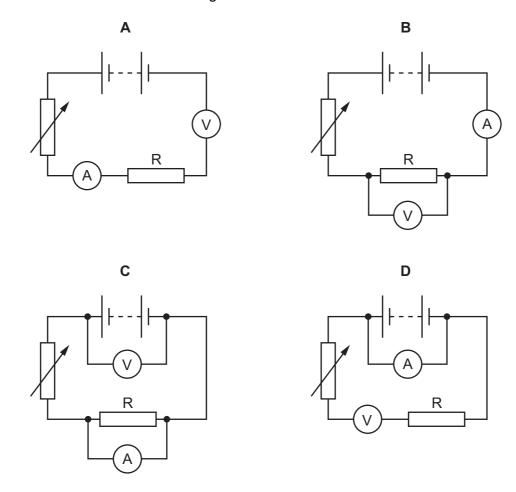


meter Y

Which meters show a reading of 1.6 V?

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

36 Which circuit is used when determining the resistance of the resistor R?



- **37** What is the benefit of earthing the metal case of an electric kettle?
 - **A** It prevents an electric shock if the live wire touches the metal case.
 - **B** It prevents the insulation of the cable from becoming damaged.
 - **C** It prevents overheating of the cable.
 - **D** It prevents overheating of the kettle.
- **38** Two different isotopes have the same number of protons in their nuclei.

Which statement describes these isotopes?

- **A** They are different elements with a different number of neutrons in their nuclei.
- **B** They are different elements with the same number of neutrons in their nuclei.
- **C** They are the same element with a different number of neutrons in their nuclei.
- **D** They are the same element with the same number of neutrons in their nuclei.

- 39 What is an alpha-particle?
 - an electron
 - electromagnetic radiation В
 - C four protons
 - two protons and two neutrons
- **40** A sample of an isotope of bromine contains 9.6×10^{24} atoms. The half-life of this isotope is 2.4 hours.

How many atoms of the isotope are present in the sample after 7.2 hours?

- **A** 1.2×10^3
- **B** 3.2×10^8 **C** 1.2×10^{24} **D** 3.2×10^{24}

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The Periodic Table of Elements

	\	ه ₂	helium 4	10	Ne	neon 20	18	Ā	argon 40	36	궃	krypton 84	55	Xe	xenon 131	98	R	radon			
	II/			6	Щ	fluorine 19	17	Cl	chlorine 35.5	35	ğ	bromine 80	53	П	iodine 127	85	¥	astatine -			
	I			8	0	oxygen 16	16	ഗ	sulfur 32	34	Se	selenium 79	52	<u>e</u>	tellurium 128	84	Ъ	polonium -	116	^	livermorium -
	>			7	z	nitrogen 14	15	₾	phosphorus 31	33	As	arsenic 75	51	Sp	antimony 122	83	:E	bismuth 209			
	>			9	O	carbon 12	14	Si	silicon 28	32	Ge	germanium 73	20	Sn	tin 119	82	Pb	lead 207	114	F1	flerovium
	≡			2	Δ	boron 11	13	Αl	aluminium 27	31	Ga	gallium 70	49	I	indium 115	81	11	thallium 204			
										30	Zu	zinc 65	48	В	cadmium 112	80	Нg	mercury 201	112	ű	copernicium
										29	Co	copper 64	47	Ag	silver 108	62	Αu	gold 197	111	Rg	roentgenium -
dn										28	z	nickel 59	46	Pd	palladium 106	78	宀	platinum 195	110	Ds	darmstadtium -
Group										27	ပိ	cobalt 59	45	뫈	rhodium 103	77	'n	iridium 192	109	¥	meitnerium -
	-	- I	hydrogen 1							26	Fe	iron 56	4	Ru	ruthenium 101	92	Os	osmium 190	108	Hs	hassium
										25	Mn	manganese 55	43	ပ	technetium -	75	Re	rhenium 186	107	Bh	bohrium
					loc	ISS				24	ပ်	chromium 52		Mo		74	≥	tungsten 184	106	Sg	seaborgium
			Key	atomic number	atomic symbo	name relative atomic mass				23	>	vanadium 51	41	g	niobium 93	73	<u>a</u>	tantalum 181	105	Op	dubnium
					ato	rela				22	ı	titanium 48	40	Zr	zirconium 91	72	Ξ	hafnium 178	104	꿉	rutherfordium -
										21	Sc	scandium 45	39	>	yttrium 89	57–71	lanthanoids		89–103	actinoids	
	=			4	Be	beryllium 9	12	Mg	magnesium 24	20	Ca	calcium 40	38	ഗ്	strontium 88	56	Ba	barium 137	88	Ra	radium
	_			က	:=	lithium 7	1	Na	sodium 23	19	¥	potassium 39	37	Rb	rubidium 85	55	Cs	caesium 133	87	ŗ	francium

71 Lu				_	_
V V	ytterblum 173	102	Š	nobelium	ı
69 Tm	thullum 169	101	Md	mendelevium	ı
П	erblum 167	100	Fm	ferminm	ı
0H	165	66	Es	einsteinium	I
99 Dy	dysprosium 163	86	ర	californium	ı
65 Tb	terblum 159	26	番	berkelium	ı
Gd	gadolinium 157	96	CB	curium	ı
63 Eu	europium 152	98	Am	americium	ı
Sm	samarium 150	94	Pu	plutonium	I
Pm	prometnium -	93	ď	neptunium	ı
9 Z	neodymium 144	92	\supset	uranium	238
59 Pr	praseodymium 141	91	Ра	protactinium	231
C e	cenum 140	06	Т	thorium	232
La La	lantnanum 139	68	Ac	actinium	I
lanthanoids			actinoids		

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