Cambridge Assessment International Education

Cambridge IGCSE™

PHYSICAL SCIENCE **0652/11**

Paper 1 Multiple Choice (Core) **October/November 2020**

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

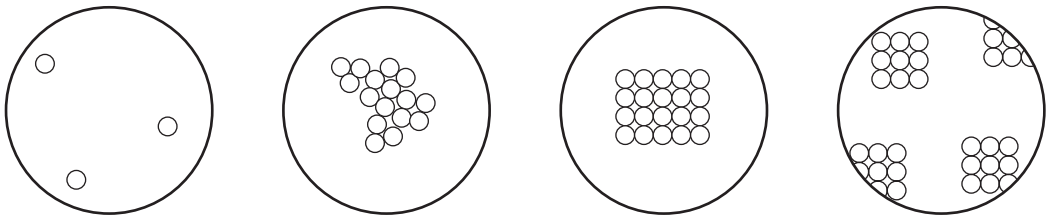
- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **16** pages. Blank pages are indicated.

[Turn over

1 Which diagram represents the arrangement of particles in a liquid?

A **B** **C** **D**



2 A bottle of a solid is labelled as shown.

CITRIC ACID
(anhydrous)

melting point: 153 °C

The melting point of a sample from the bottle is measured.

The sample melts over a temperature range from 140 °C to 150 °C.

Which statement explains this observation?

A The sample contains a mixture of citric acid and other solids.

B The sample is too large.

C The sample has a pH less than 7.

D The sample is too small.

3 Which statement describes a compound?

A It is a mixture of two or more elements.

B It is a substance containing two or more elements chemically combined.

C It is a substance that can be easily separated by physical means.

D It is a substance that cannot be broken down by chemical means.

4 The element *moscovium* was first made in 2003.

An atom of the element moscovium is represented by the symbol $^{287}_{115}\text{Mc}$.

What is the total number of protons and neutrons in the nucleus of this atom?

A 115 **B** 172 **C** 287 **D** 402

5 Rubidium iodide is an ionic compound.

Which row describes what happens to the rubidium and iodine atoms when they form ions?

	rubidium atoms	iodine atoms
A	gain one electron	gain one electron
B	gain one electron	lose one electron
C	lose one electron	gain one electron
D	lose one electron	lose one electron

6 Which row describes the properties of an ionic compound?

	volatility	solubility in water
A	low	insoluble
B	low	soluble
C	high	insoluble
D	high	soluble

7 Which statement about the structures of diamond and graphite is correct?

A They are both macromolecules.

B They both have a layered structure.

C They both have delocalised electrons.

D They both have each carbon atom joined to four others.

8 The formula of aluminium sulfate is $Al_2(SO_4)_3$.

Which row shows the number of atoms of each element in aluminium sulfate?

	Al	S	O
A	2	1	4
B	2	1	12
C	2	3	4
D	2	3	12

9 Magnesium reacts with acids to produce hydrogen gas.

Under which set of conditions is hydrogen produced most slowly?

	magnesium	acid	temperature / °C
A	ribbon	concentrated	40
B	ribbon	dilute	20
C	powder	concentrated	40
D	powder	dilute	20

10 Word equations for two reactions are shown.

zinc oxide + carbon → zinc + carbon monoxide

iron + copper oxide → copper + iron oxide

Which statement about the two reactions is correct?

A Carbon and copper oxide have been oxidised.

B Carbon and iron have been reduced.

C Zinc oxide and copper oxide have been oxidised.

D Zinc oxide and copper oxide have been reduced.

11 Wasp stings contain an alkali.

The pH values of some substances are shown.

substance	pH value
saliva	7.4
lime	12.4
salt solution	7.0
vinegar	3.5

Which substance could be used to neutralise a wasp sting?

A lime

B saliva

C salt solution

D vinegar

12 A colourless solution of X is tested with aqueous sodium hydroxide and with acidified silver nitrate solution.

The results are shown.

test	result
aqueous sodium hydroxide	white precipitate
acidified silver nitrate	white precipitate

What is X?

A iron(II) carbonate

B iron(II) sulfate

C zinc sulfate

D zinc chloride

13 What is used to show the presence of chlorine?

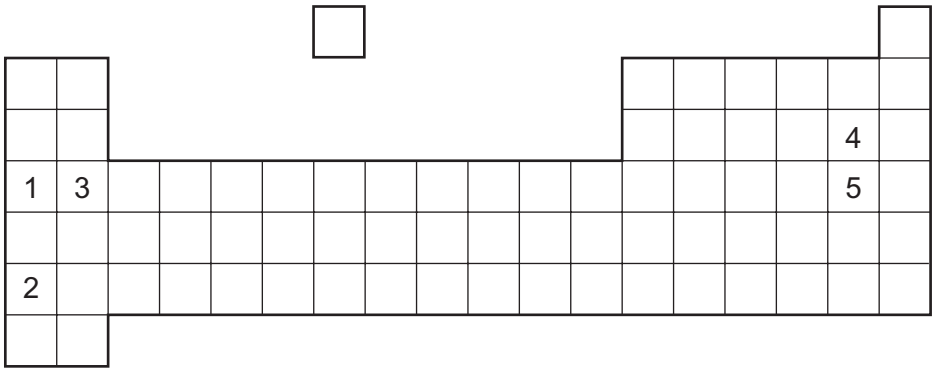
A a lighted splint

B bromine water

C damp litmus paper

D limewater

14 Part of the Periodic Table is shown.



Which pair of elements combine together to form an ionic compound?

A 1 and 2 **B** 2 and 3 **C** 3 and 4 **D** 4 and 5

15 Some properties of aluminium are listed.

1 low density

2 good conductor of electricity

3 strong

4 shiny

One use of aluminium is in aircraft parts.

Which properties of aluminium are needed for this use?

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

16 Which row shows a correct order of reactivity of metals?

	least reactive ⟶		most reactive
A	copper	calcium	magnesium
B	copper	magnesium	calcium
C	iron	magnesium	zinc
D	zinc	iron	calcium

17 Which of the statements about water are correct?

1 Water is used as a solvent.

2 Water is used to prevent iron from rusting.

3 Water is a compound that contains two parts of oxygen to one part of hydrogen.

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

18 One member of the alkane homologous series is butane which is used as a fuel.

What are the products of combustion when butane is burned in excess air?

A carbon and water

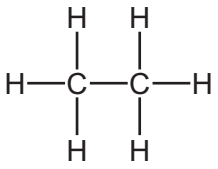
B carbon dioxide and hydrogen

C carbon dioxide and water

D carbon monoxide and water

19 The structures of three hydrocarbons are shown.

1



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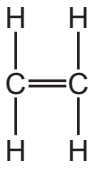

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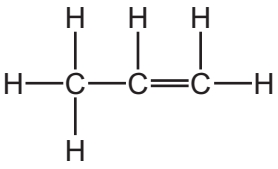


Which hydrocarbons decolourise bromine water?

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

20 Liquid X has the properties shown.

- It is colourless.
- It is flammable.
- It can be made by the reaction of ethene with steam.
- The complete combustion of X produces carbon dioxide and water.

What is X?

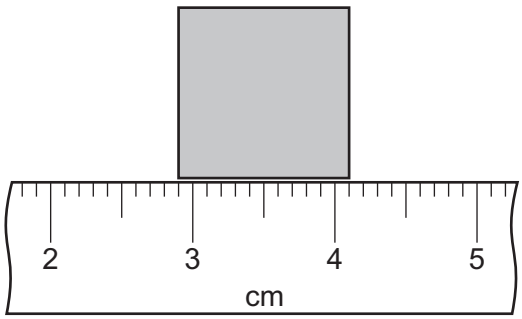
A ethanol

B methane

C petrol

D poly(ethene)

21 A metre rule is used to measure a side of a square.



What is the length of the side of the square?

A 1.0 cm **B** 1.2 cm **C** 2.9 cm **D** 4.1 cm

22 What does the gradient of a speed–time graph show?

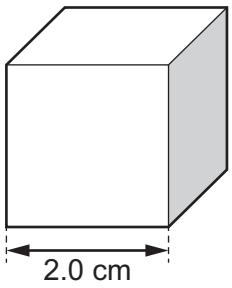
A acceleration

B average speed

C final speed

D distance travelled

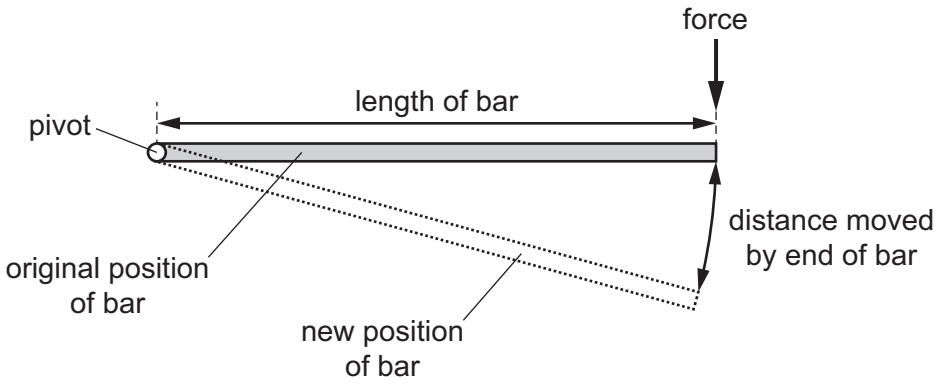
23 The diagram shows a solid cube of metal. Each side has a length of 2.0 cm. The mass of the cube is 72 g.



What is the density of the metal?

A 9.0 g / cm^3 **B** 18 g / cm^3 **C** 288 g / cm^3 **D** 576 g / cm^3

24 A bar has a pivot at one end. A force acts on the other end of the bar and makes the bar rotate about the pivot.



Which equation shows how the moment of the force is calculated?

A $\text{moment} = \dfrac{\text{force}}{\text{distance moved by end of bar}}$

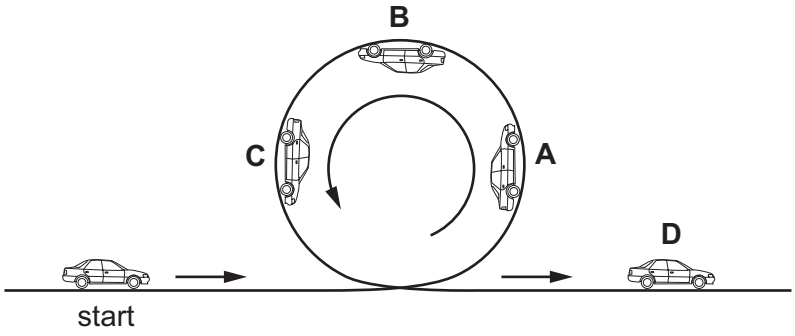
B $\text{moment} = \dfrac{\text{force}}{\text{length of bar}}$

C moment = force × distance moved by end of bar

D moment = force × length of bar

25 A toy car without a motor is pushed, then follows the looped track shown.

At which labelled point on the track is the kinetic energy (energy of motion) of the car decreasing and the potential energy (energy of position) increasing?



26 A student measures his power output by lifting a load of weight *W* through a vertical height *h*. In time *t*, he lifts the load *n* times.

The student changes one of these variables to increase his power output.

Which change produces this increase?

A decreasing *h*

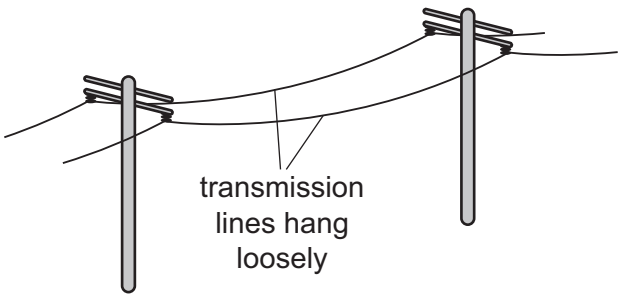
B decreasing *n*

C decreasing *t*

D decreasing *W*

27 When electricity transmission lines are suspended from poles, they are allowed to hang loosely instead of being tightly stretched.

The diagram shows the arrangement.



Why are the transmission lines allowed to hang loosely?

A It prevents them from breaking when the temperature decreases.

B It prevents them from breaking when the temperature increases.

C It prevents them from touching the ground when the temperature decreases.

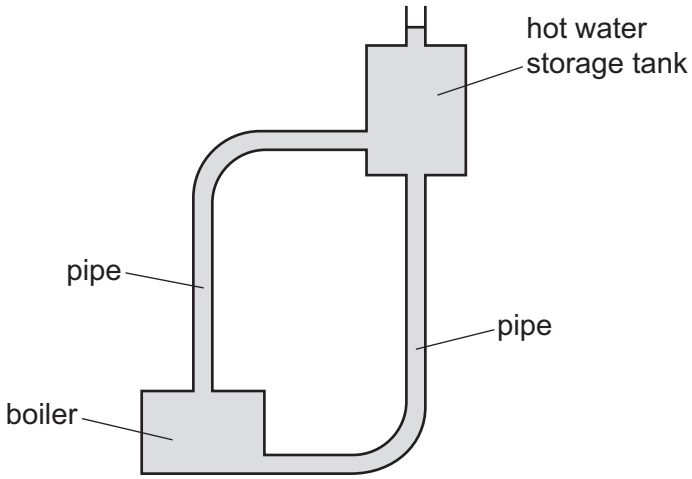
D It prevents them from touching the ground when the temperature increases.

28 Which row shows what happens to the temperature of a solid as it melts, and to the temperature of a liquid as it boils?

	temperature of a solid as it melts	temperature of a liquid as it boils
A	increases	increases
B	no change	increases
C	increases	no change
D	no change	no change

29 The diagram shows part of the hot water system in a house.

Water is heated in the boiler and moves, without using a pump, up to the hot water storage tank.



By which process does the heated water move up from the boiler to the hot water storage tank?

A conduction

B convection

C emission

D radiation

30 A boy throws a small stone into a pond. A wave spreads out from where the stone hits the water.

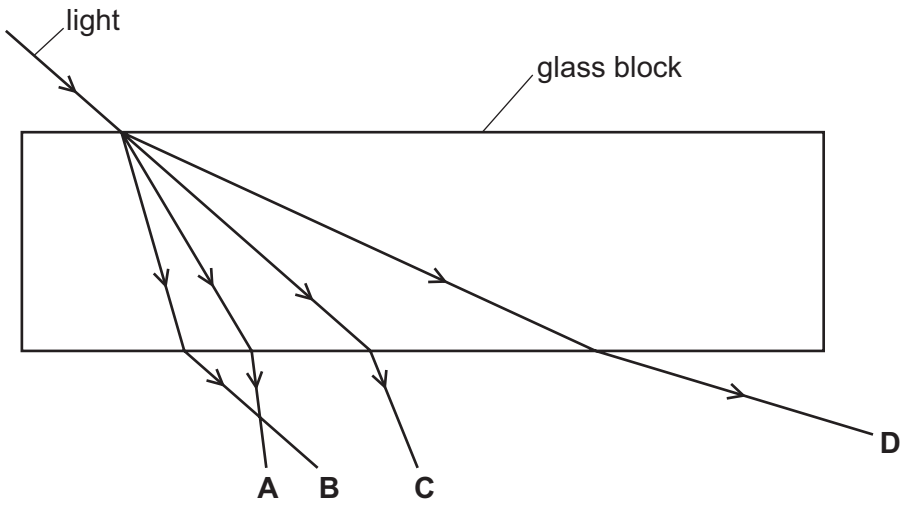
The boy notices that 8 wave crests reach the side of the pond every 5.0 s.

What is the frequency of the wave?

A 0.20 Hz **B** 0.63 Hz **C** 1.6 Hz **D** 40 Hz

31 The diagram shows light incident on a glass block.

Which labelled arrow shows the path of the light passing through and after it has passed through the block?



32 What is the approximate range of frequencies of sound that can be heard by the human ear?

A 2 Hz to 2000 Hz

B 2 kHz to 2000 kHz

C 20 Hz to 20 000 Hz

D 20 kHz to 20 000 kHz

33 An electric door lock contains a permanent magnet and an electromagnet.

What are suitable materials for the permanent magnet and for the core of the electromagnet?

	permanent magnet	core of electromagnet
A	soft iron	soft iron
B	soft iron	steel
C	steel	soft iron
D	steel	steel

[Turn over

34 Two plastic rods are each rubbed with a cloth.

The rods are brought close to each other and they move apart.

Which statement explains this?

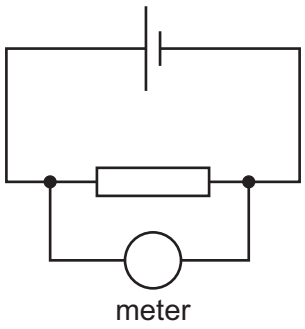
A Like charges repel.

B Like poles repel.

C Unlike charges repel.

D Unlike poles repel.

35 A meter is connected across a resistor as shown.



Which row gives the quantity measured by the meter and the unit?

	quantity	unit
A	current	ampere
B	current	volt
C	potential difference	ampere
D	potential difference	volt

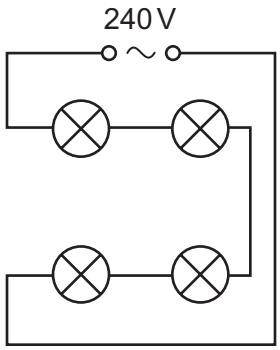
36 How does the resistance of a wire change when its length increases and when its diameter decreases?

	length increases	diameter decreases
A	resistance decreases	resistance decreases
B	resistance decreases	resistance increases
C	resistance increases	resistance decreases
D	resistance increases	resistance increases

37 Four 240 V lamps are to be powered by a 240 V supply.

Which circuit allows all four lamps to light at full brightness?

A



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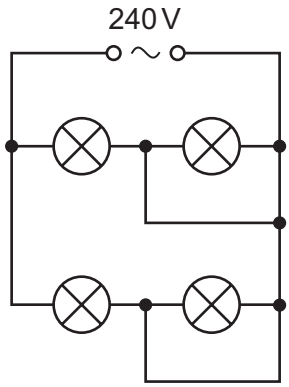
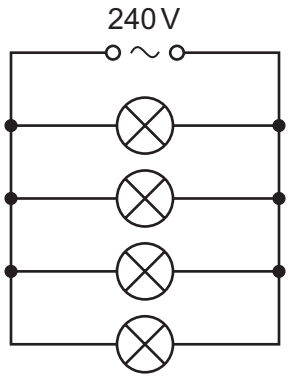
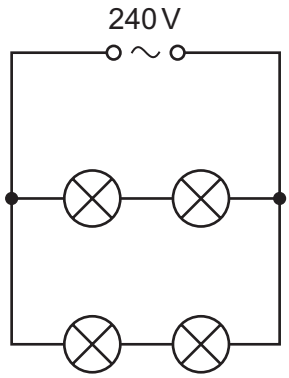


C



D



38 Overheating of a cable in an electric circuit is a safety hazard.

How can overheating of the cable be prevented?

A Do not switch off the circuit with damp hands.

B Make sure that the current does not become too large.

C Use thicker insulation on the cable.

D Use a thinner cable.

39 The diagram represents the nucleus of an atom.

Which diagram represents the nucleus of a different isotope of this atom?

A

B

C

D

40 A scientist measures the radiation emitted from a radioactive material every week for three weeks.

The results are shown but the reading for week 1 is missing.

time / weeks	number of emissions per minute
0	2000
1	missing reading
2	500
3	250

What is the most likely reading for week 1?

A 750 emissions per minute

B 1000 emissions per minute

C 1500 emissions per minute

D 1750 emissions per minute

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The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	VIII
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium –	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89–103 actinoids	104 Rf rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

atomic number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).