

NAMIBIA SENIOR SECONDARY CERTIFICATE

PHYSICAL SCIENCE ORDINARY LEVEL

4323/1

PAPER 1 Multiple Choice

1 hour

Marks 40

2020

Additional Materials: Multiple choice answer sheet
Non-programmable calculator
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write in soft pencil.
- Make sure that you receive the multiple choice answer sheet with **your examination number** on it.
- 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.
- If you want to change an answer, thoroughly erase the one you wish to delete.
- The Periodic Table is printed on page 15.
- **Read the instructions on the answer sheet carefully.**
- Each correct answer will score one mark.
- Any rough working should be done in this booklet.
- All questions in this paper carry equal marks.
- You may use a non-programmable calculator.

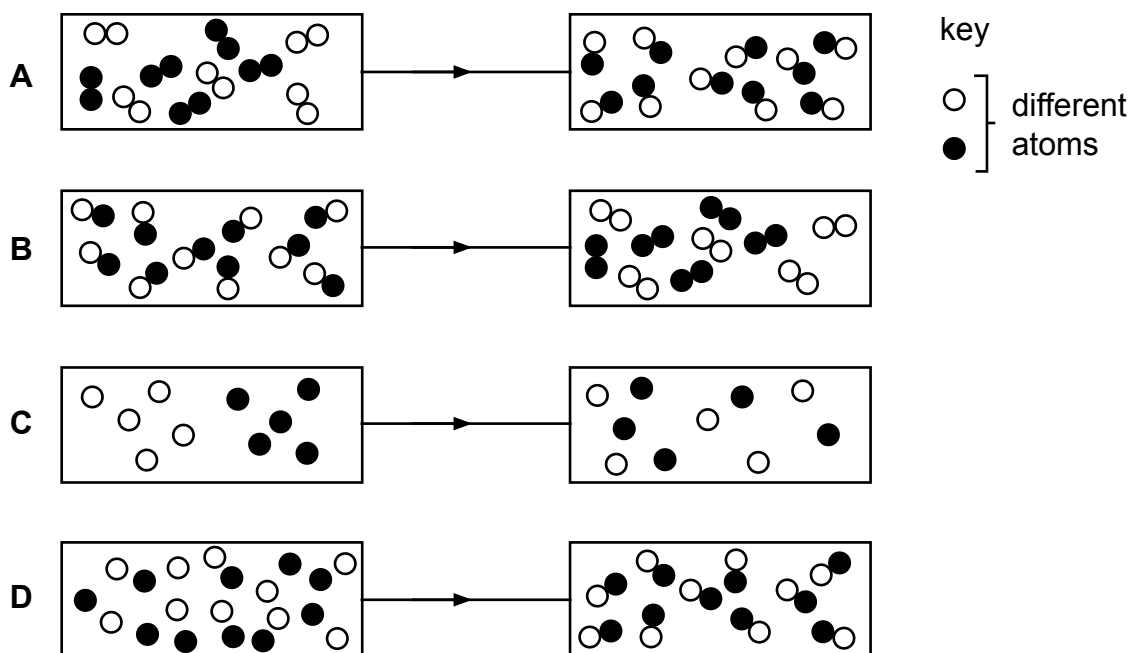
This document consists of **15** printed pages and **1** blank page.



Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Which diagram shows the process of diffusion?



2 Which method is most suitable to obtain silver chloride from a suspension of silver chloride in water?

- A chromatography
- B crystallisation
- C distillation
- D filtration

3 In an experiment a Grade 12 student is requested to “quickly add 50 cm³ of an acid”.

Which of the following is the best piece of apparatus to use?

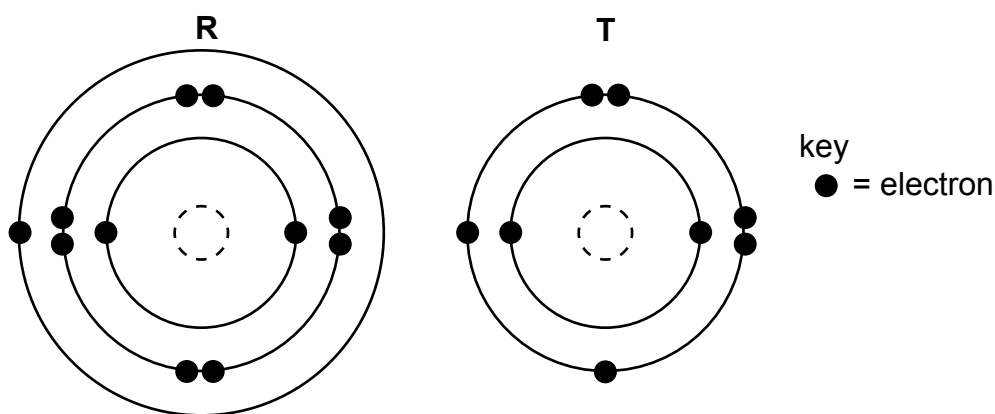
- A a beaker
- B a conical flask
- C a measuring cylinder
- D a round bottom flask

4 The table shows the numbers of electrons in the outer shell of a nitrogen atom and of an argon atom.

Which row is correct?

	$^{14}_7\text{N}$	$^{40}_{18}\text{Ar}$
A	5	8
B	7	8
C	5	10
D	7	10

- 5 The diagram shows the electronic structures of atoms **R** and **T**.



R and **T** react to form an ionic compound.

What is the formula of the compound formed?

- A** RT_2
B R_2T
C R_2T_6
D R_6T_2
- 6 A compound has the formula $CH_3CH_2OCH_3$.

How should the relative molecular mass, M_r , of this compound be calculated?

- A** $12 + 8 + 16$
B $(12 \times 3) + (1 \times 8) + (16 \times 1)$
C $(12 \times 8) + (1 \times 8) + (16 \times 3)$
D $(12 \times 8) + (1 \times 8) + (1 \times 16)$
- 7 Which row in the table shows a compound with its correct formula?

	compound	formula
A	ammonium hydroxide	$NH_3(OH)_2$
B	copper(II) sulfate	$CuSO_4$
C	iron(II) sulfide	Fe_3S
D	silver nitrate	Ag_2NO_3

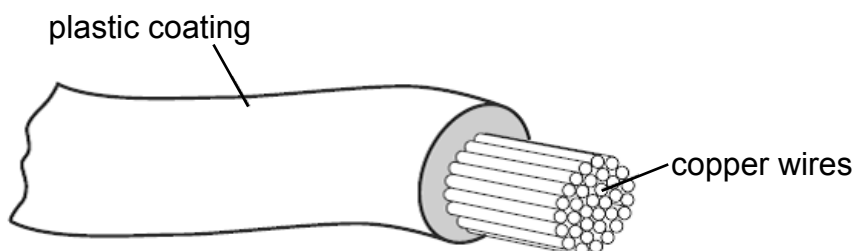
- 8 Which row in the table gives a correct use of graphite and a correct use of diamond?

	graphite	diamond
A	drilling	drilling
B	drilling	lubrication
C	lubrication	drilling
D	lubrication	lubrication

- 9 Which equation is the correct balanced chemical equation for the reaction between magnesium and water?

- A $\text{Mg} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2 + \text{H}_2$
 B $\text{Mg} + \text{H}_2\text{O} \rightarrow \text{MgOH} + \text{H}_2$
 C $\text{Mg} + 2\text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2 + \text{H}_2$
 D $\text{Mg} + 2\text{H}_2\text{O} \rightarrow \text{MgOH} + \text{H}_2$

- 10 The diagram shows an electrical cable.



Which row in the table gives the reasons for using copper wires and a plastic coating?

	copper wires	plastic coating
A	good electrical conductor	good electrical conductor
B	good electrical conductor	good electrical insulator
C	good electrical insulator	good electrical conductor
D	good electrical insulator	good electrical insulator

- 11 Some white anhydrous copper(II) sulfate powder is put into a beaker containing a clear colourless liquid.

What would show that the clear colourless liquid is water?

- A A blue solution is formed.
 B A pink solution is formed.
 C A stream of bubbles are produced in the liquid.
 D The powder explodes with a popping sound.

- 12 Which gas is formed when ammonium chloride is warmed with aqueous sodium hydroxide?
- A ammonia
B chlorine
C nitrogen
D oxygen
- 13 Which statement describes a process in which an endothermic change takes place?
- A burning candle
B rusting of iron
C melting ice
D nuclear fission

- 14 Calcium carbonate reacts with hydrochloric acid to form carbon dioxide.

Three changes to the experiment are suggested.

- 1 decreasing the particle size of calcium carbonate
- 2 decreasing the temperature
- 3 increasing the concentration of hydrochloric acid

Which change(s) would speed up this reaction?

- A 1 and 2 only
B 1 and 3 only
C 2 only
D 3 only
- 15 Which row in the table shows a transition metal?

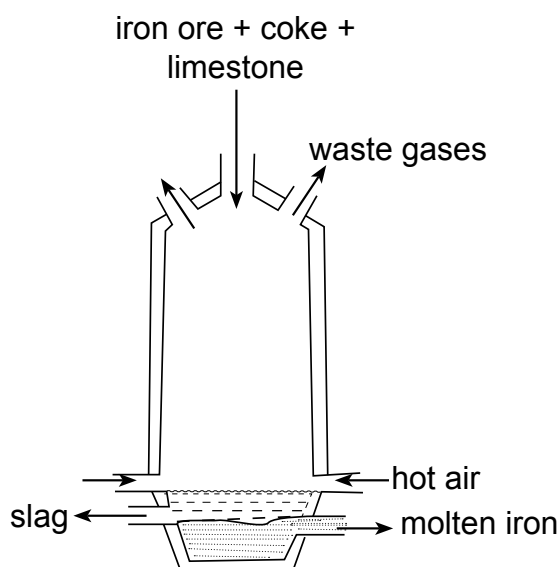
	colour of the metal chloride	melting point (°C)
A	colourless	113
B	green	1085
C	white	1085
D	yellow	113

- 16 An oxide of element Y dissolves in water to form a solution of pH 10.

Which row in the table is correct about element Y?

	type of element	type of oxide
A	metallic	acidic
B	metallic	basic
C	non-metallic	acidic
D	non-metallic	basic

17 The diagram shows a blast furnace used to extract iron from iron ore.



What is the purpose of adding limestone to the furnace?

- A to cause the iron to melt
 - B to change impurities in the ore into slag
 - C to change the ore into iron
 - D to produce oxygen for the coke to burn
- 18 At a waterworks, what is the importance of chlorination?
- A to kill bacteria in the water
 - B to make the water clean
 - C to remove bad smell from the water
 - D to remove solid particles from the water
- 19 The list shows three fractions of petroleum, 1, 2, and 3 that are obtained by fractional distillation, together with some of their uses.

Fraction 1 → making roads

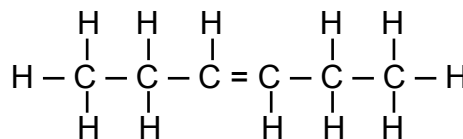
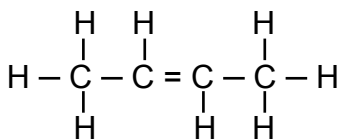
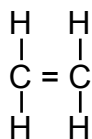
Fraction 2 → cooking

Fraction 3 → jet fuel

Which row in the table correctly identifies fractions 1, 2 and 3?

	Fraction 1	Fraction 2	Fraction 3
A	bitumen	kerosene	refinery gas
B	bitumen	refinery gas	kerosene
C	kerosene	bitumen	refinery gas
D	kerosene	refinery gas	bitumen

20 The structures of three compounds are shown.

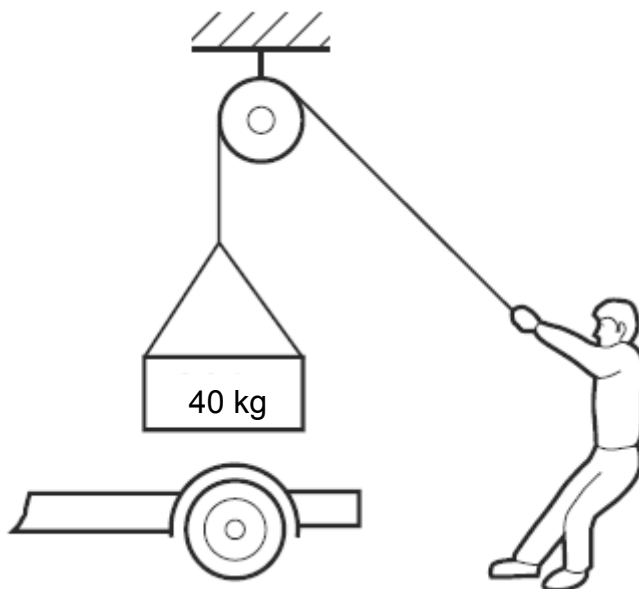


Which statement explains why these substances belong to the same homologous series?

- A They all have an even number of hydrogen atoms.
 B They all have the same functional group.
 C They are all hydrocarbons.
 D They are all unsaturated.
- 21 Which row in the table shows three quantities that are all vectors?

	quantities
A	displacement, force, velocity
B	displacement, velocity, time
C	force, mass, displacement
D	mass, velocity, time

22 The diagram shows a man supporting a mass of 40 kg. He releases the rope and the mass falls into the back of a lorry.



What is the resultant force on the mass when it is falling?

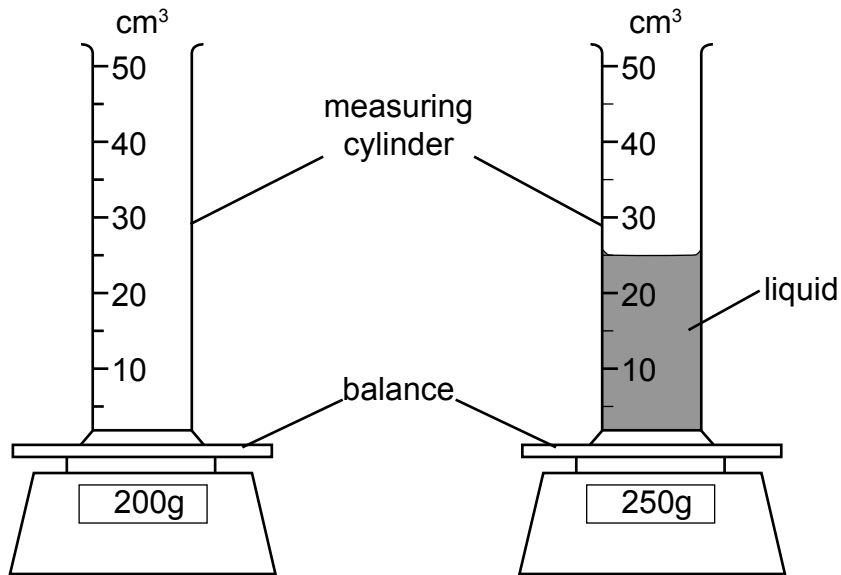
- A 0 N
 B 4 N
 C 40 N
 D 400 N

- 23 The circuit of a motor racing track is 3.0 km in length. In a race, a car completes the circuit 40 times in 45 minutes.

What is the average speed of the car?

- A 30 km/hour
- B 90 km/hour
- C 120 km/hour
- D 160 km/hour

- 24 The diagram shows an experiment to find the density of a liquid.

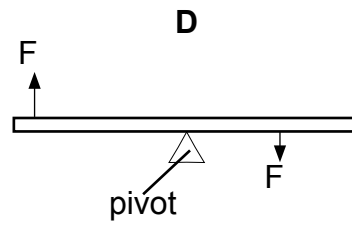
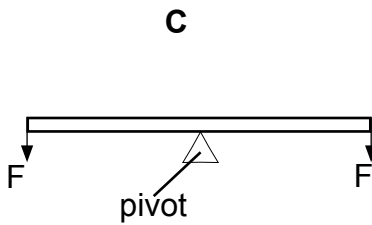
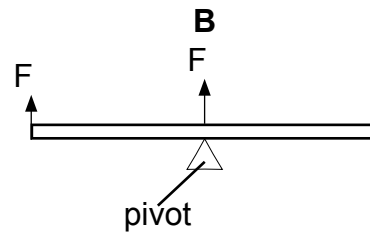
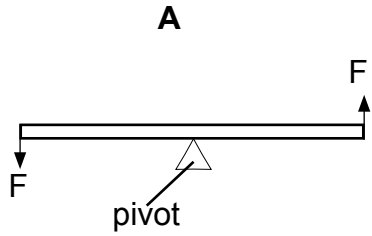


What is the density of the liquid?

- A 0.50 g/cm³
- B 2.0 g/cm³
- C 20 g/cm³
- D 50 g/cm³

- 25 The diagrams show a uniform rod with its midpoint on a pivot. Two equal forces F are applied to the rod, as shown.

Which diagram shows the rod in equilibrium?



- 26 The sensitivity of a liquid-in-glass thermometer depends on the volume of liquid used and the diameter of its capillary.

Which pair of changes definitely increases the sensitivity of the thermometer?

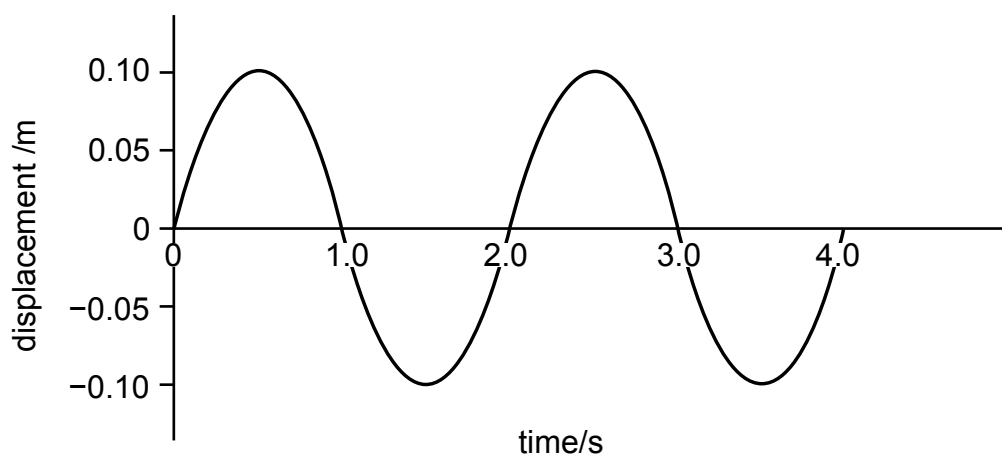
	volume of the liquid used	diameter of the capillary
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

27 Fuels are a source of energy in many power stations.

How is chemical energy in fuels released?

- A conversion from gravitational energy
- B conversion from strain energy
- C fission of heavy atoms
- D regrouping of atoms

28 The diagram shows how displacement varies with time as a wave passes a fixed point.



What is the frequency of this wave?

- A 0.50 Hz
- B 1.0 Hz
- C 2.0 Hz
- D 4.0 Hz

29 A student claps once when standing 100 m away from a large wall. The speed of sound in air is 330 m/s.

How long after the clap does the student hear the echo?

- A 0.30 s
- B 0.61 s
- C 1.7 s
- D 3.3 s

30 A student of height 1.7 m stands 2.0 m from the front of a plane mirror.

Which statement describes the image of the student?

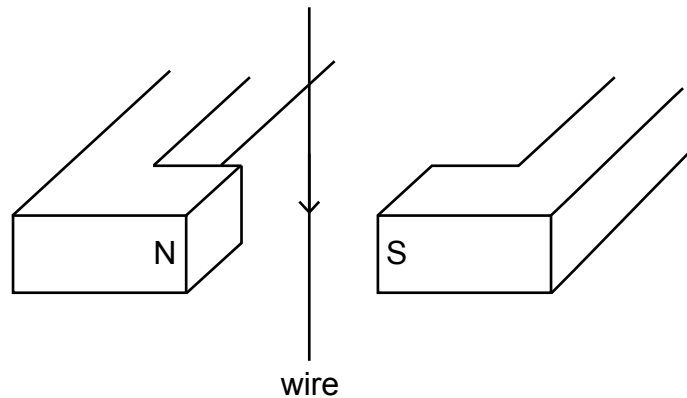
- A Real, 2.0 m behind the mirror and shorter than 1.7 m.
- B Real, 2.0 m behind the mirror and equals to 1.7 height.
- C Virtual, 2.0 m behind the mirror and shorter than 1.7 m.
- D Virtual, 2.0 m behind the mirror and equal to 1.7 height.

31 A coil of a copper wire wrapped around a core is used as an electromagnet.

Which combination would produce the strongest electromagnet?

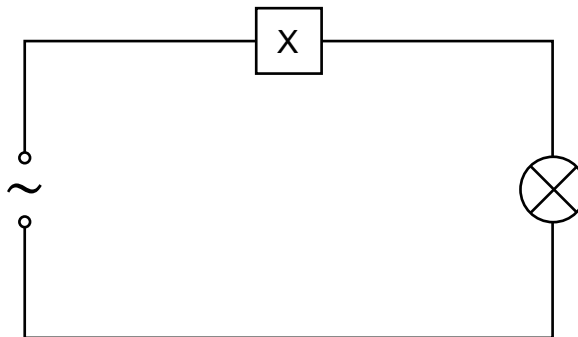
	number of turns	core
A	few	soft-iron
B	few	steel
C	many	soft-iron
D	many	steel

32 The diagram shows a current carrying wire which hangs between the poles of an electromagnet.



In which direction does the wire move?

- A** into the page
 - B** to the left hand side of the page
 - C** out of the page
 - D** to the right hand side of the page
- 33 The component X is designed to automatically cut off the electricity supply if the current is too large.



What is component X?

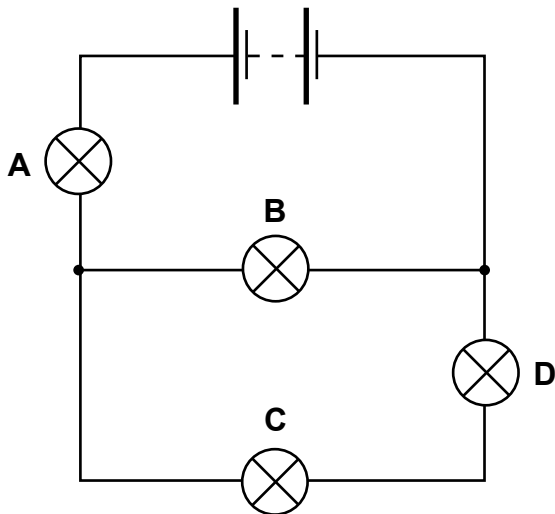
- A** a diode
- B** a fuse
- C** a resistor
- D** an ammeter

34 Which copper wire has the lowest resistance?

- A** a long, thick wire
- B** a long, thin wire
- C** a short, thick wire
- D** a short, thin wire

35 The circuit shows a battery and four lamps. All the lamps are lit. One lamp fails and all the lamps go out.

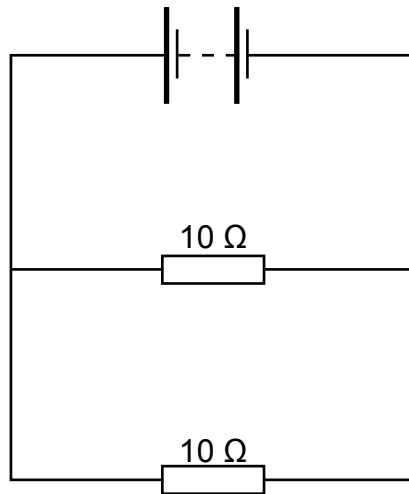
Which lamp failed?



36 Which of the following uses the most energy?

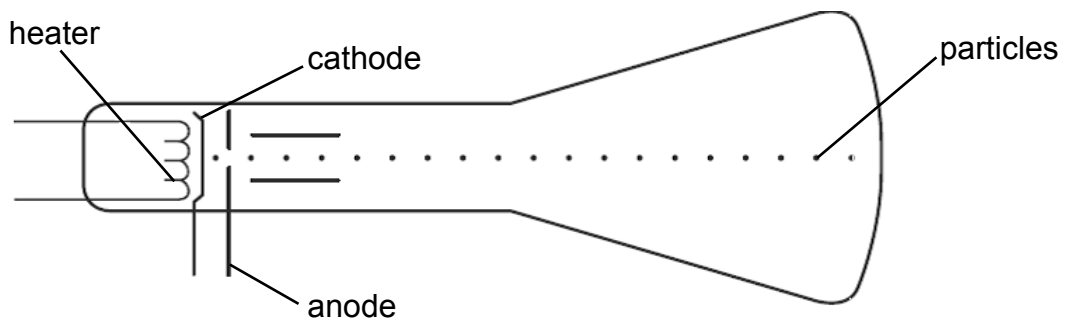
- A** a 5000 W electric cooker used for 1 minute
- B** a 1000 W electric fire used for 10 minutes
- C** a 500 W electric iron used for 1 hour
- D** a 100 W lamp used for 1 day

- 37 The diagram shows a circuit containing two $10\ \Omega$ resistors.



What is the total resistance in the circuit?

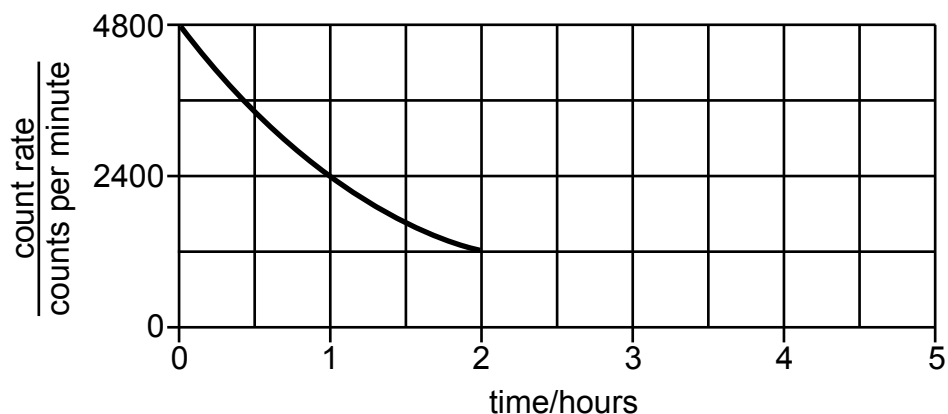
- A $0.50\ \Omega$
 - B $5.0\ \Omega$
 - C $10\ \Omega$
 - D $20\ \Omega$
- 38 In a cathode-ray tube, the hot cathode emits particles which are accelerated across the tube.



What are these particles?

- A atoms
- B electrons
- C neutrons
- D protons

- 39 The graph shows how the count rate on a detector due to a radioactive source changes with time.



What is the count rate at 5.0 hours?

- A 38 counts per minute
 B 75 counts per minute
 C 150 counts per minute
 D 300 counts per minute
- 40 How does the ionising effect of α -particles compare with that of β -particles and γ -rays?

	compared with β -particles	compared with γ -rays
A	α -particles are less strongly ionising	α -particles are less strongly ionising
B	α -particles are less strongly ionising	α -particles are more strongly ionising
C	α -particles are more strongly ionising	α -particles are less strongly ionising
D	α -particles are more strongly ionising	α -particles are more strongly ionising

DATA SHEET
The Periodic Table of the Elements

Group

I	II	III	IV	V	VI	VII	0
7 Li Lithium 3	9 Be Beryllium 4	11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
23 Na Sodium 11	24 Mg Magnesium 12	27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35,5 Cl Chlorine 17	40 Ar Argon 18
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	101 Ru Ruthenium 44	106 Pd Palladium 46
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	190 Os Osmium 76	195 Pt Platinum 78
87 Fr Francium	226 Ra Radium 88	227 Ac Actinium 89	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84
			64 Cu Copper 29	65 Zn Zinc 30	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34
			59 Ni Nickel 28	59 Co Cobalt 27	70 Ga Gallium 31	75 As Arsenic 33	80 Br Bromine 35
			103 Rh Rhodium 45	103 Rh Rhodium 45	115 In Indium 49	122 Sb Antimony 51	127 I Iodine 53
			186 Re Rhenium 75	186 Re Rhenium 75	112 Cd Cadmium 48	122 Sb Antimony 51	131 Xe Xenon 54
			144 Nd Neodymium 60	144 Nd Neodymium 60	112 Cd Cadmium 48	122 Sb Antimony 51	131 Xe Xenon 54
			141 Pr Praseodymium 59	141 Pr Praseodymium 59	108 Ag Silver 47	122 Sb Antimony 51	131 Xe Xenon 54
			140 Ce Cerium 58	140 Ce Cerium 58	197 Au Gold 79	209 Bi Bismuth 83	210 Po Polonium 84
			232 Th Thorium 90	232 Th Thorium 90	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			141 Pr Praseodymium 59	141 Pr Praseodymium 59	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			144 Nd Neodymium 60	144 Nd Neodymium 60	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			150 Sm Samarium 62	150 Sm Samarium 62	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			152 Eu Europium 63	152 Eu Europium 63	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			157 Gd Gadolinium 64	157 Gd Gadolinium 64	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			159 Tb Terbium 65	159 Tb Terbium 65	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			162 Dy Dysprosium 66	162 Dy Dysprosium 66	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			165 Ho Holmium 67	165 Ho Holmium 67	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			167 Er Erbium 68	167 Er Erbium 68	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			169 Tm Thulium 69	169 Tm Thulium 69	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			173 Yb Ytterbium 70	173 Yb Ytterbium 70	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			175 Lu Lutetium 71	175 Lu Lutetium 71	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84
			103 Lr Lawrencium	103 Lr Lawrencium	204 Tl Thallium 81	209 Bi Bismuth 83	210 Po Polonium 84

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

Key

a = relative atomic mass
X = atomic symbol
 b = proton (atomic) number

*58 - 71 Lanthanoid series
 †90 - 103 Actinoid series

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