NAMIBIA SENIOR SECONDARY CERTIFICATE

PHYSICAL SCIENCE ORDINARY LEVEL 4323/1

PAPER 1 Multiple Choice — 1 hour

Marks 40 — **2017**

Additional Materials: Multiple choice answer sheet
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 **Candidate 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 14.

- **Read the instructions on the answer sheet carefully.**

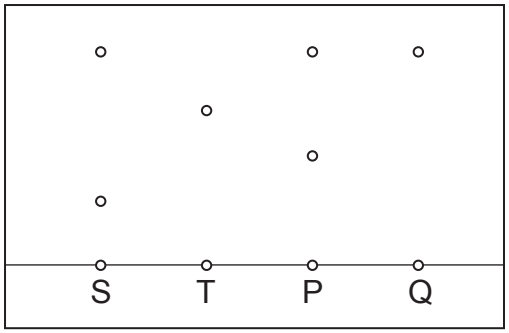
- Each correct answer will score one mark.
- Any rough working should be done in this question paper.
- You may use a non-programmable calculator.

This document consists of **14** printed pages and **2** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

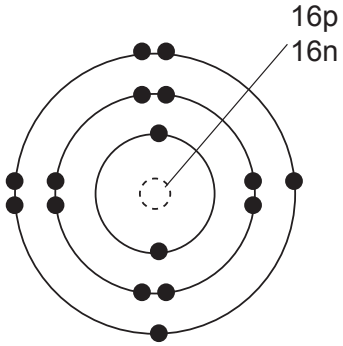
1 The diagram shows the results of a chromatography experiment.



Which pair of substances are impure substances?

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

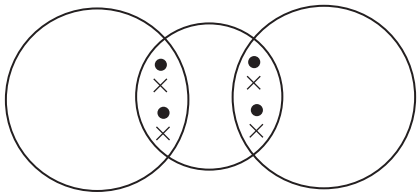
2 The diagram shows the structure of an atom.



What is the nucleon number and the number of neutrons of this atom?

	nucleon number	number of neutrons
A	8	32
B	16	8
C	32	16
D	32	8

3 The diagram shows the bonding electrons in a covalent molecule.



Which molecule is shown?

A carbon dioxide
B carbon monoxide
C chlorine
D methane

4 What is the relative formula mass of NH_4OH?

A 32
B 35
C 36
D 77

5 Which statement is correct about exothermic reactions?

A Energy is always absorbed during the reaction.
B Energy is always released during the reaction.
C Energy is used to break chemicals bonds only.
D The reaction vessels feel cooler after the reaction.

6 When hydrogen is reacted with heated copper(II) oxide, copper metal and water are produced.

$$CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$$

Which substance is reduced during the reaction?

A copper
B hydrogen
C oxygen
D water

7 Sodium hydroxide reacts with carbon dioxide.

Which compound is one of the products?

A NaO
B $NaCO_2$
C $NaHCO_3$
D Na_2C

8 The statements below are about metals and their oxides.

When metals form ions they .....1..... electrons.

Some metals form amphoteric others form .....2..... oxides.

Which words complete the statements?

	1	2
A	gain	acidic
B	gain	basic
C	lose	acidic
D	lose	basic

9 In a titration experiment, dilute hydrochloric acid is added to aqueous sodium hydroxide mixed with the Universal Indicator until it reaches the end point.

What is the pH value and the colour of the Universal Indicator at the end point?

	end point	
	pH value	colour of Universal Indicator
A	2	blue
B	2	green
C	7	blue
D	7	green

10 Which equation shows a neutralisation reaction?

A $2Mg + O_2 \rightarrow 2MgO$

B $NH_3 + HCl \rightarrow NH_4Cl$

C $N_2 + 3H_2 \rightarrow 2NH_3$

D $S + O_2 \rightarrow SO_2$

11 Element G forms two different ions and coloured compounds.

In which part of the Periodic Table is element G?

A alkali metals

B alkali earth metals

C transition metals

D metalloids

12 Which group, in the Periodic Table, contains non-metals that form diatomic molecules?

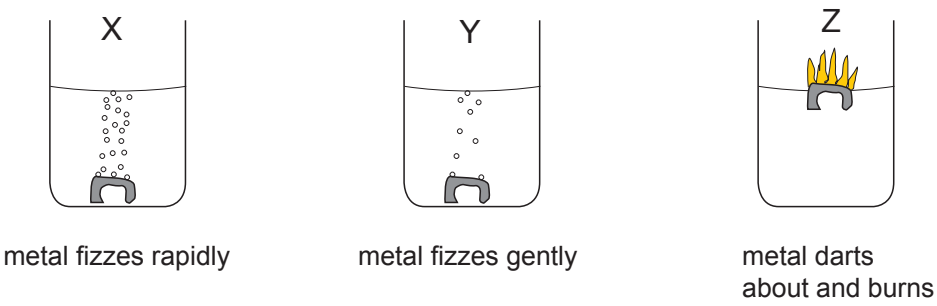
A Group 0

B Group 2

C Group 4

D Group 7

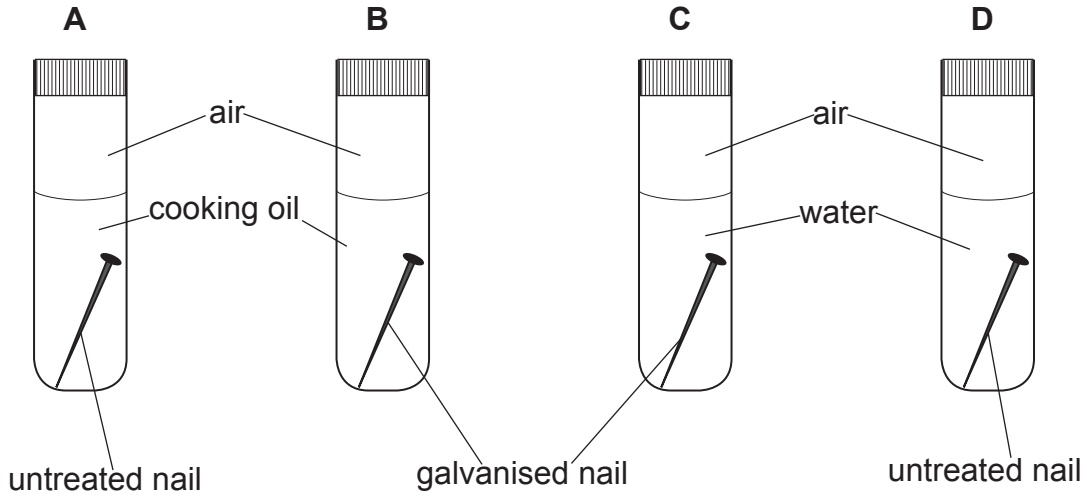
13 The diagrams show what is observed when three metals X, Y and Z are added to water.



What are the metals?

	X	Y	Z
A	calcium	aluminium	sodium
B	aluminium	sodium	calcium
C	aluminium	calcium	sodium
D	sodium	calcium	aluminium

14 Four test tubes containing different liquids, different iron nails and air are shown.



In which test tube will the nail rust the fastest?

15 A chemical test to determine the presence of water is carried out. A drop of a liquid is added to anhydrous copper (II) sulfate.

What colour change shows the presence of water?

A blue to pink
B blue to white
C pink to blue
D white to blue

16 Which row in the table shows the correct number of carbon atoms present in a molecule of propanol, and its homologous series?

	number of carbon atoms	homologous series
A	2	acid
B	2	alcohol
C	3	acid
D	3	alcohol

17 Which statement about homologous series of alkanes is correct?

A They contain a carbon to carbon double bond.

B They contain carbon to carbon single bonds only.

C They decolourise bromine water.

D They have the same boiling point.

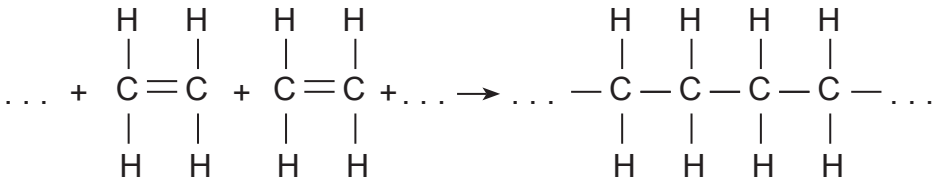
18 The equation shows a reaction between ethene and substance P.

$$\text{ethene} + \text{substance P} \xrightarrow{\text{catalyst}} \text{ethanol}$$

What is this type of reaction and what is substance P?

	type of reaction	substance P
A	addition	bromide water
B	addition	steam
C	cracking	bromide water
D	cracking	steam

19 Many units of ethene are added together in a process called addition polymerisation as shown in the diagram to form product X.



product X

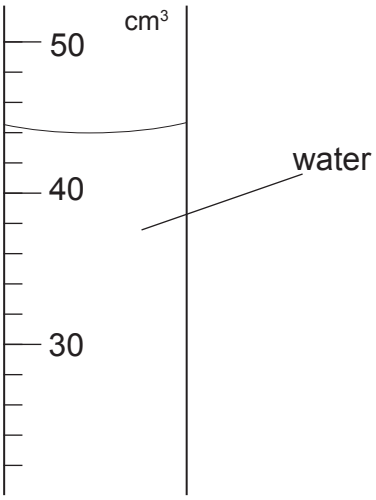
Which row in the table is correct about product X?

	name	property
A	polyethane	saturated
B	polyethane	unsaturated
C	polyethene	unsaturated
D	polyethene	saturated

20 What are the products of complete combustion of all hydrocarbons?

A carbon dioxide only
B carbon dioxide and hydrogen
C carbon dioxide and water
D hydrogen and water

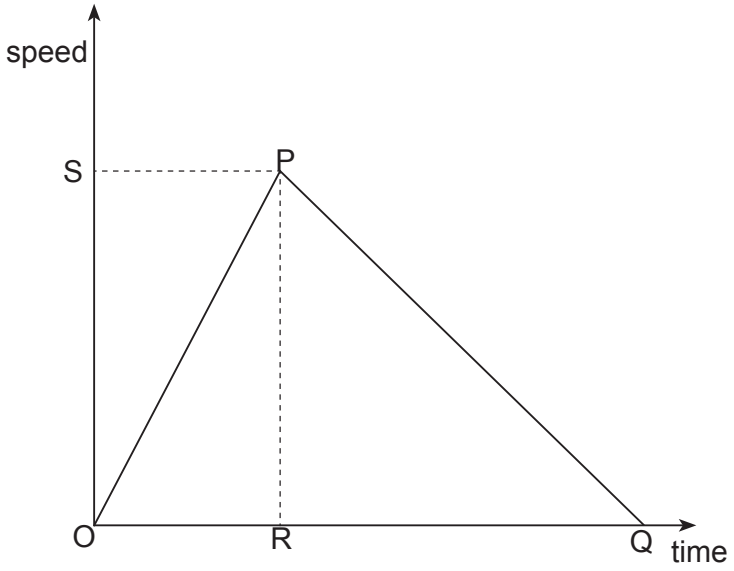
21 The diagram shows water in a measuring cylinder.



What is the volume of the water in the measuring cylinder?

A 42.0 cm^3
B 42.2 cm^3
C 44.0 cm^3
D 44.2 cm^3

22 The graph shows the speed of a motorist changing with time.



Which area gives the total distance travelled within the time OQ?

A the area OPQ
B the area RPQ
C the area OPR
D the area OSPR

23 Which quantity is measured in watts?

A energy
B mass
C power
D weight

24 An apple falls from an apple tree.

Which word describes its acceleration when air resistance is negligible?

A constant
B decreasing
C increasing
D zero

25 An astronaut has a mass of 76 kg.

What is the astronaut's weight on earth?

A 7.6 N
B 76 N
C 760N
D 7600N

26 A school bus driving between Mariental and Keetmanshoop stops 150 km from Mariental for 15 minutes. It took a total of 3 hours to complete the journey.

The total distance between Mariental and Keetmanshoop is 230 km.

What is the average speed of the bus when it was in motion?

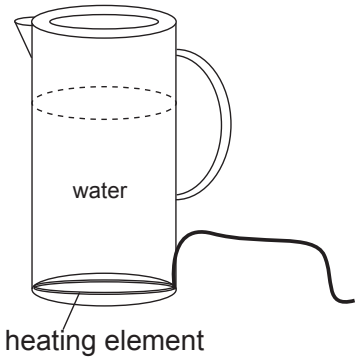
A 37.5 km/h
B 76.7 km/h
C 83.6 km/h
D 280 km/h

27 An athlete is running a race. He starts from rest at point **X.** At point **Y**, he is running at his greatest speed.

Which form of energy does the athlete have at point **X** and at point **Y**?

	energy at point **X**	energy at point **Y**
A	chemical potential energy only	kinetic energy only
B	chemical potential energy only	chemical potential energy and kinetic energy
C	kinetic energy only	chemical potential energy only
D	kinetic energy only	chemical potential energy and kinetic energy

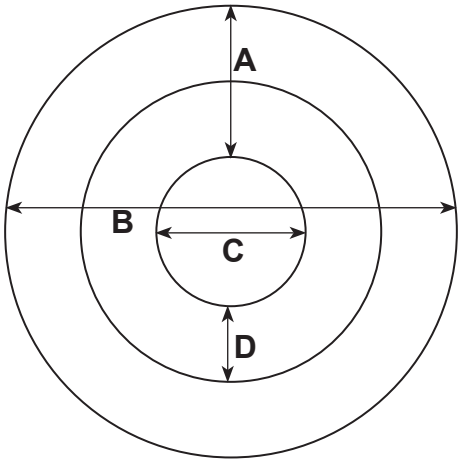
28 The diagram shows an electric kettle with its heating element placed at the bottom.



Which statement explains why the heating element is placed at the bottom of the kettle?

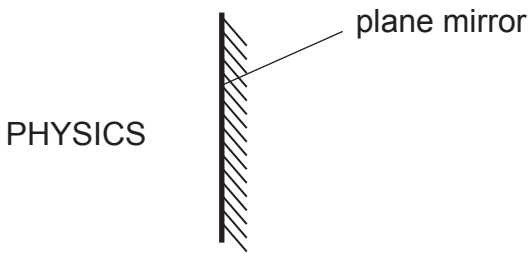
A Cold water rises causing conduction.
B Cold water rises causing convection.
C Hot water rises causing conduction.
D Hot water rises causing convection.

29 The diagram shows wave fronts formed on the surface of a water pond.



Which measurement on the diagram shows the wavelength?

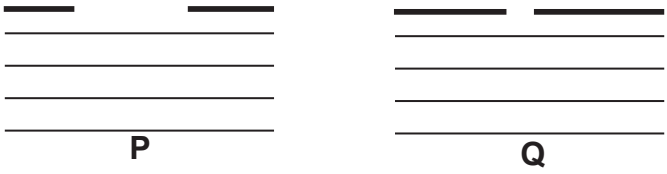
30 The word PHYSICS is placed in front of a plane mirror.



What is the image shown behind the mirror?

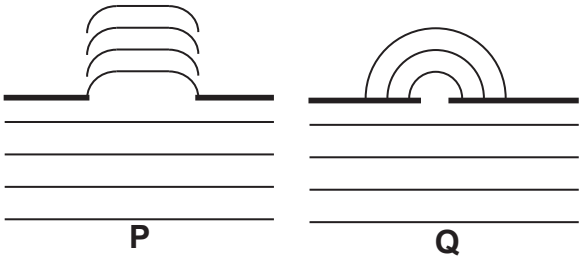
A	**B**	**C**	**D**
PHYSICS	ꟼHYSICS	SCISYHꟼ	ꟼHYSICS

31 The diagram shows two ripple tanks with water waves approaching a barrier with openings of different sizes.

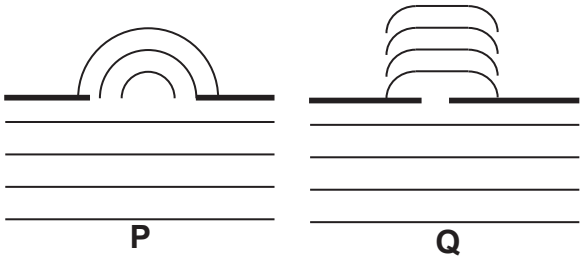


Which diagram shows what happens to the waves?

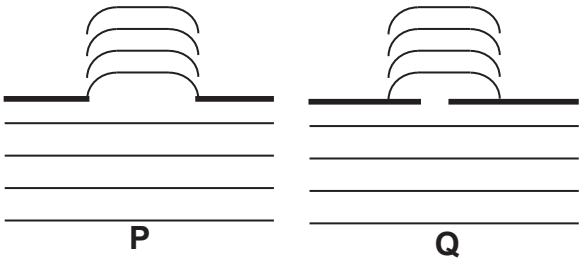
A



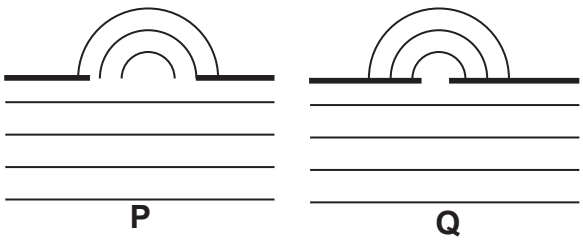
B



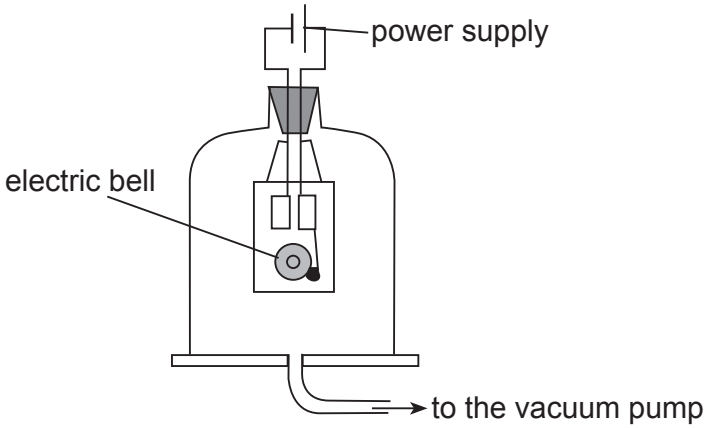
C



D



32 The diagram shows a bell jar connected to a vacuum pump.

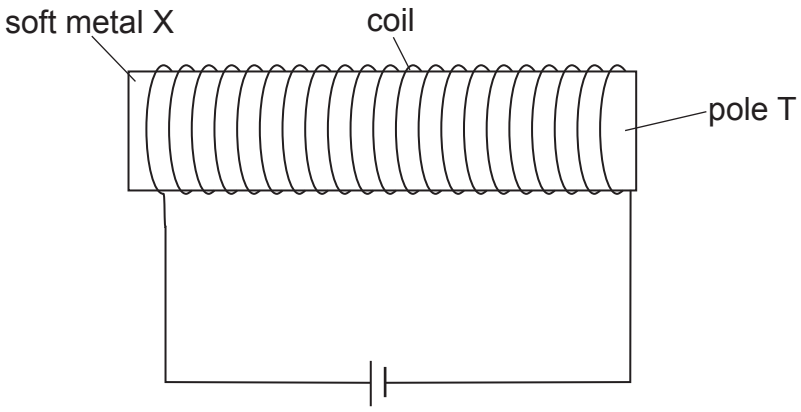


When the bell jar has air in it the bell can be heard. When air is removed the bell cannot be heard.

What does this show about sound?

	through air	through a vacuum
A	can travel	can travel
B	can travel	cannot travel
C	cannot travel	can travel
D	cannot travel	cannot travel

33 A piece of soft metal X is placed in a coil to form an electromagnet with a magnetic pole T.

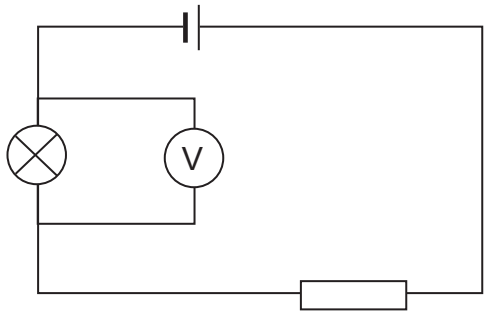


Which metal is the best to use as metal X and what is the resulting pole T of the electromagnet?

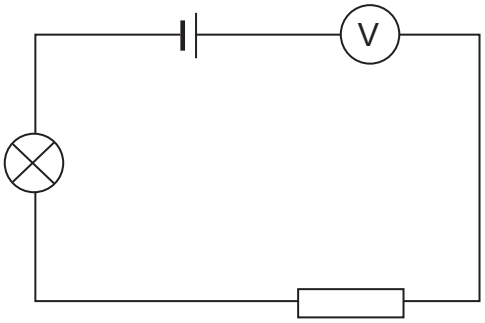
	metal X	resulting pole T
A	copper	north
B	copper	south
C	iron	north
D	iron	south

34 Which circuit diagram shows how a voltmeter is connected to measure the potential difference across the cell?

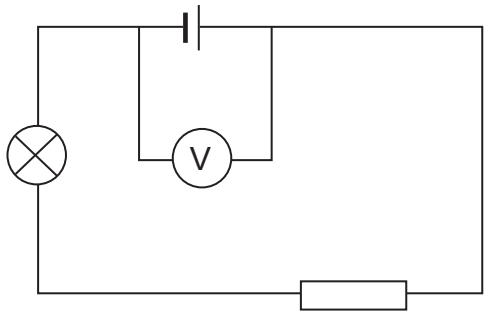
A



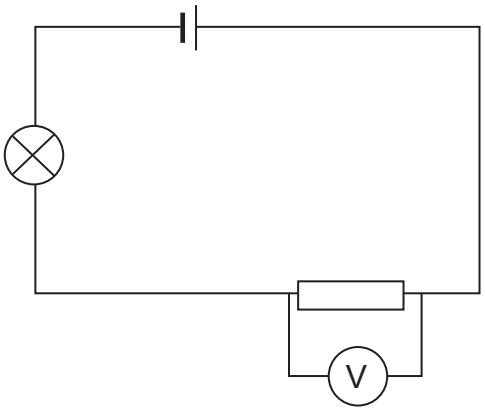
B



C



D



35 The table shows the potential difference and current for four electric heaters.

Which heater has the least resistance?

	voltage/V	current/A
A	112	5.0
B	112	10
C	240	5.0
D	240	10

36 Which is the unit for resistance?

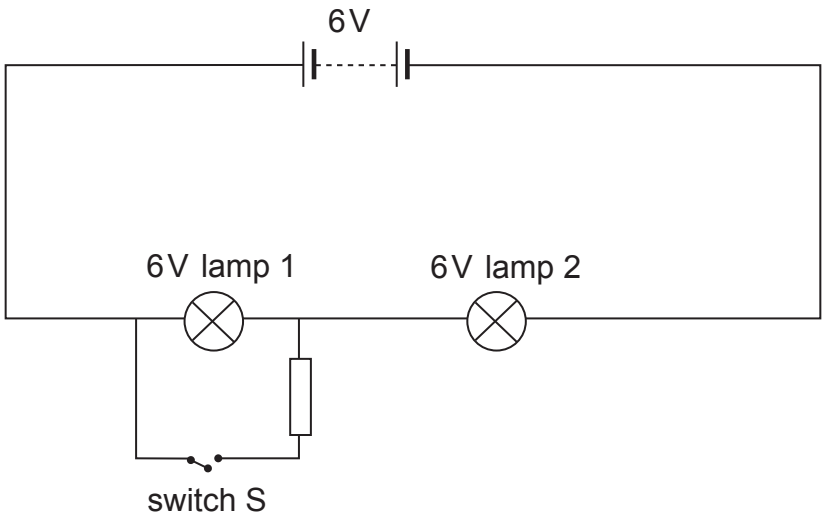
A ampere

B newton

C ohm

D watt

37 The diagram shows a circuit with two 6V lamps connected to a 6V battery.



What happens to the brightness of lamp 2 when switch S is closed?

A it becomes dimmer
B it becomes brighter
C it turns off
D it remains unchanged

38 Which particles are given off from the hot cathode in a cathode ray tube?

A alpha
B atoms
C electrons
D protons

39 An unstable nucleus has a nucleon number of 237 and contains 92 protons. It emits a beta-particle.

What is the nucleon number and number of protons after the beta-particle has been emitted?

	mass number	number of protons
A	236	92
B	236	93
C	237	92
D	237	93

40 Which statement correctly describes isotopes?

A atoms of the same element with different number of electrons
B atoms of the same element with different number of neutrons
C atoms of the same element with different number of protons
D atoms of the same element with different number of shells

DATA SHEET
The Periodic Table of the Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H Hydrogen 1										4 He Helium 2
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	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57 *	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	Po Polonium 84	At Astatine 85	Rn Radon 86
Fr Francium 87	226 Ra Radius 88	227 Ac Actinium 89 †															

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

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92	Np Neptunium 93	Pu Plutonium 94	Am Americium 95	Cm Curium 96	Bk Berkelium 97	Cf Californium 98	Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101	No Nobelium 102	Lr Lawrencium 103

Key

a
X
b

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

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

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