KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL STANDARDISED ASSESSMENT

GRADE 10

PHYSICAL SCIENCES P2

JUNE 2026

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MARKS: 75

DURATION: 1½ hours

This question paper consists of 9 pages and 2 data sheets.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX questions. Answer ALL the questions in the ANSWER BOOK.
2. Start EACH question on a NEW page in the ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper. downloaded from Stanmorephysics
4. Leave ONE line between two sub-questions, for example between QUESTION 2.1 and QUESTION 2.2.
5. You may use a non-programmable calculator.
6. You may use appropriate mathematical instruments.
7. You are advised to use the attached DATA SHEETS.
8. Show ALL formulae and substitutions in ALL calculations.
9. Round off your final numerical answers to a minimum of TWO decimal places.
10. Give brief motivations, discussions et cetera where required.
11. Write neatly and legibly.

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QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Choose the answer and write only the letter (A–D) next to the question number (1.1–1.5) in the ANSWER BOOK, for example 1.6 E.

1.1 When a metal bonds with a non-metal, the non-metal atom will.....

A lose electrons and decrease in size

B gain electrons and decrease in size

C lose electrons and increase in size

D gain electrons and increase in size (2)

1.2 Which ONE of the following is correct regarding a PHYSICAL CHANGE of a substance?

(i) No new substances are formed.
(ii) Intermolecular forces are broken.
(iii) Energy changes are large.
(iv) Number of atoms are conserved.

A (i), (ii) and (iv) only

B (i), (iii) and (iv) only.

C (i), (ii) and (iii) only

D (i) and (ii) only (2)

1.3 The electronegativity of elements of the Periodic Table increases ...

A across the groups from left to right.

B across the period from left to right.

C down the periods of the same group.

D when their relative atomic mass decreases. (2)

1.4 Nitrogen has a higher first ionisation energy than oxygen.
Which statement explains this observation?

A The radius of an oxygen atom is smaller.

B An oxygen atom has more electron shells occupied.

C Oxygen has paired electrons in the 2p sub-shell.

D An oxygen atom has more protons in the nucleus (2)

1.5 A mixture of gases consists of 12.0 g of hydrogen, 42.0 g of nitrogen and 4.0 g of helium. downloaded from Stanmorephysics
What is the mole fraction of hydrogen in the mixture?

A 0.21
B 0.60
C 0.71
D 0.75 (2)

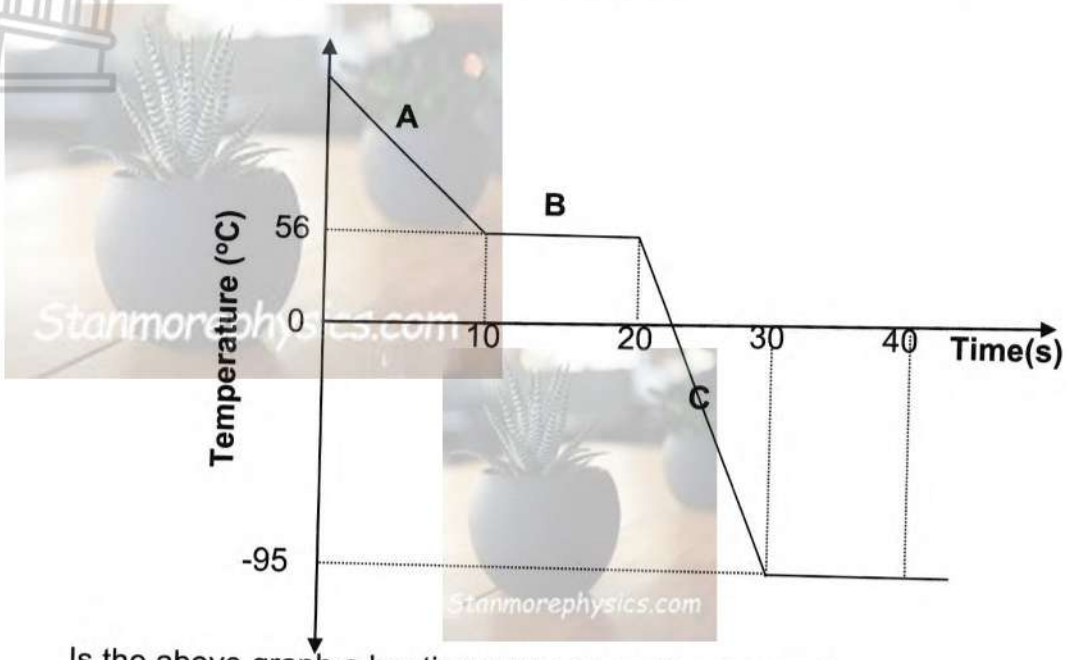
[5 x 2 = 10]

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QUESTION 2 (Start on a new page.)

Study the temperature versus time graph for acetone and answer the questions that follow.
The boiling point of acetone is 56°C and its melting point is -95°C.
NOTE: The graph is NOT drawn to scale.



2.1 Is the above graph a heating curve or cooling curve of acetone. Give a reason . (2)

2.2 Define *melting point* (2)

2.3 In what phase(Gas, liquid or solid) are the particles at :

2.3.1 section A (1)

2.3.2 room temperature (25 °C) (1)

2.4 On section B on the graph, there is no temperature change. Explain this observation. (2)

2.5 Name the processes that take place at the following time intervals :

2.5.1 10 s -20 s (1)

2.5.2 30 s - 40 s (1)

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2.6 Sketch a **well-labelled** heating or cooling curve **but** showing a process that opposes the one above. Indicate all **relevant temperatures** on the graph. No time values are required on the x-axis. (3)

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QUESTION 3 (Start on a new page.)

Chlorine is a non-metallic element with an atomic number of 17 and can exist as isotopes.

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3.1 Define the term *isotopes*. (2)

3.2 Write down the :

3.2.1 Number of valence electrons in a chlorine atom (1)

3.2.2 Valency of chlorine (1)

3.2.3 group for Cℓ in the periodic table (1)

3.2.4 Period for Cℓ in the periodic table (1)

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Natural chlorine consists of Cℓ - 35 and Cℓ - 37.

3.3 Calculate the relative % abundance of the isotope Cℓ - 35 in natural chlorine if the relative atomic mass of chlorine is 35.5 (AMU) (4)

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QUESTION 4 (Start on a new page.)

The table below shows letters that represent different types of elements and their respective atomic numbers, chemical formulae and electronic configurations.
Use the information provided in the table to answer questions 4.1.1 to 4.1.4.
DO NOT REDRAW THE TABLE, write ONLY THE ANSWER next to the question number eg 4.1.5 $A\ell^{3+}$ downloaded from Stanmorephysics

ELEMENT	ATOMIC NUMBER	ACTUAL CHEMICAL FORMULA	ELECTRONIC CONFIGURATION
A	**4.1.1**	S^{2-}	**4.1.2**
B	12	**4.1.3**	$1s^2\ 2s\ 2p^6$
C	**4.1.4**	N^{3-}	$1s^2\ 2s^2\ 2p^6$

(4)

4.2 Element **D** is found in group **II** and period **4** of the periodic table.

Draw/Write down the :

4.2.1 Number of electrons that element D loses or gains during chemical reactions (1)

4.2.2 Aufbau diagram for element D (3)

4.2.3 Type of a chemical bond(covalent/ionic/metallic) that element D is involved with in forming compounds (1)

4.3 Define *covalent bond* (2)

4.4 Draw Lewis diagrams of :

4.4.1 $H C\ell$ (2)

4.4.2 Magnesium bromide (2)

4.5 Write down the chemical formulae of

4.5.1 Dinitrogen tetroxide (2)

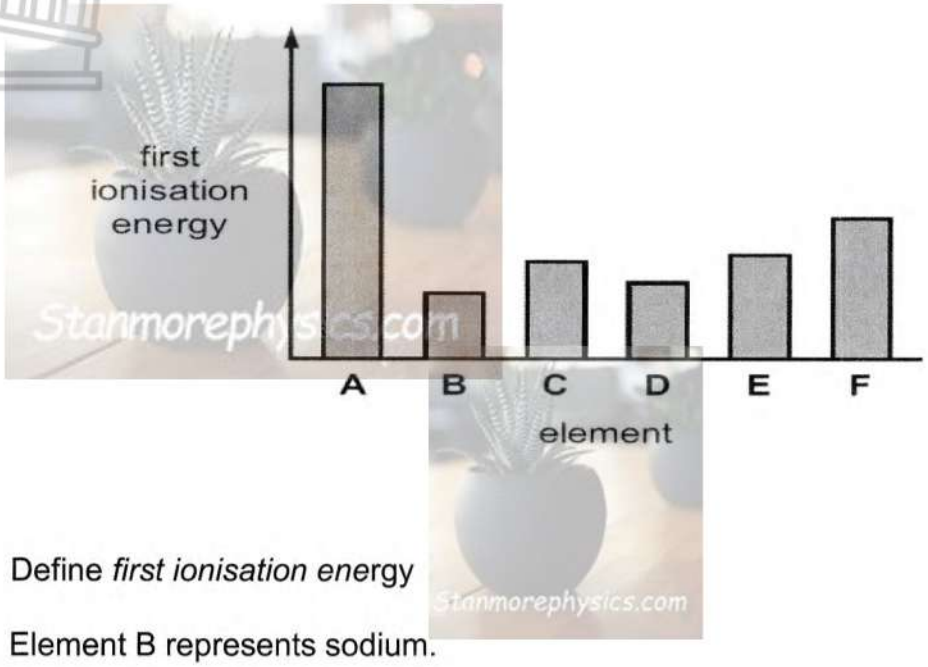
4.5.2 Iron III iodide (2)

4.4.3 Ammonium sulphate (2)

. **[21]**

QUESTION 5 (Start on a new page.)

The bar graph below shows the relative first ionisation energies of six **successive** elements in the periodic table. The letters are **not** the symbols of the elements.



5.1 Define *first ionisation energy* (2)

5.2 Element B represents sodium.

5.2.1 Write down the NAME or CHEMICAL SYMBOL of element A. (1)

5.2.2 Explain why the first ionisation energy of element **B** is much less than that of **A** on the graph. (3)

5.3 Explain the general increase in the first ionisation energies from element **B** to **F.** (3)

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QUESTION 6 (Start on a new page)

6.1 Define *one mole* (2)

The balanced chemical equation below represents the reaction between calcium carbonate($CaCO_3$) and hydrochloric acid($HC\ell$).

$$\mathbf{CaCO_3(s) + 2HC\ell\,(aq) \rightarrow CaC\ell_2\,(aq) + CO_2\,(g) + H_2O\,(l)}$$

6.2 What does **(aq)** represent in the above chemical equation? (1)

6.3 In a reaction, initially 10g of calcium carbonate reacts completely with excess hydrochloric acid. downloaded from Stanmorephysics

Calculate:

6.3.1 The molar mass of calcium carbonate (2)

6.3.2 Initial number of moles of calcium carbonate (3)

6.3.3 Number of carbon dioxide molecules produced if 2240cm^3 of CO_2 (g) at STP were released in the above reaction (4)

[12]

TOTAL 75

TABLE 1: PHYSICAL CONSTANTS

NAME	SYMBOL	VALUE
Standard pressure	p^{θ}	$1{,}013 \times 10^{5}$ Pa
Molar gas volume at STP	V_m	22,4 $dm^3 \cdot mol^{-1}$
Standard temperature	T^{θ}	273 K
Charge on electron	e	$-1{,}6 \times 10^{-19}$ C
Avogadro's constant	N_A	$6{,}02 \times 10^{23}$ mol^{-1}

TABLE 2: FORMULAE

$n = \frac{m}{M}$	$n = \frac{N}{N_A}$
$c = \frac{n}{V}$ OR $c = \frac{m}{MV}$	$n = \frac{V}{V_m}$

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TABLE 3: THE PERIODIC TABLE OF ELEMENTS

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
																	2 He 4
3 1,0 Li 7	4 1,5 Be 9											5 2,0 B 11	6 2,5 C 12	7 3,0 N 14	8 3,5 O 16	9 4,0 F 19	10 Ne 20
11 0,9 Na 23	12 1,2 Mg 24											13 1,5 Aℓ 27	14 1,8 Si 28	15 2,1 P 31	16 2,5 S 32	17 3,0 Cℓ 35,5	18 Ar 40
19 0,8 K 39	20 1,0 Ca 40	21 1,3 Sc 45	22 1,5 Ti 48	23 1,6 V 51	24 1,6 Cr 52	25 1,5 Mn 55	26 1,8 Fe 56	27 1,8 Co 59	28 1,8 Ni 59	29 1,9 Cu 63,5	30 1,6 Zn 65	31 1,6 Ga 70	32 1,8 Ge 73	33 2,0 As 75	34 2,4 Se 79	35 2,8 Br 80	36 Kr 84
37 0,8 Rb 86	38 1,0 Sr 88	39 1,2 Y 89	40 1,4 Zr 91	41 Nb 92	42 1,8 Mo 96	43 1,9 Tc	44 2,2 Ru 101	45 2,2 Rh 103	46 2,2 Pd 106	47 1,9 Ag 108	48 1,7 Cd 112	49 1,7 In 115	50 1,8 Sn 119	51 1,9 Sb 122	52 2,1 Te 128	53 2,5 I 127	54 Xe 131
55 0,7 Cs 133	56 0,9 Ba 137	57 La 139	72 1,6 Hf 179	73 Ta 181	74 W 184	75 Re 186	76 Os 190	77 Ir 192	78 Pt 195	79 Au 197	80 Hg 201	81 1,8 Tℓ 204	82 1,8 Pb 207	83 1,9 Bi 209	84 2,0 Po	85 2,5 At	86 Rn
87 0,7 Fr	88 0,9 Ra 226	89 Ac															

58 Ce 140	59 Pr 141	60 Nd 144	61 Pm	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175
90 Th 232	91 Pa	92 U 238	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

KEY/*SLEUTEL*

Atomic number
Atoomgetal

29
Electronegativity *Elektronegatiwiteit* → 1,9 Cu 63,5 ← Symbol *Simbool*

Approximate relative atomic mass
Benaderde relatiewe atoommassa

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