



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA



**PROVINCIAL STANDARDISED
ASSESSMENT**

GRADE 11

PHYSICAL SCIENCES P2 (CHEMISTRY)

JUNE 2026

MARKS: 50

DURATION: 1 hour

This question paper consists of 6 pages and 2 data sheets.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR 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.com
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 SHEET.
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.

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 (1.1–1.4) in the ANSWER BOOK, for example 1.5 E.

1.1 Which ONE of the bonds between the atoms is most polar?

A C – C

B C – H

C C – O

D C – Cl

(2)

1.2 Which ONE of the following intermolecular forces exists between Mg^{2+} and water when magnesium chloride (MgCl_2) dissolves in water?

A Hydrogen bonding

B Ion – dipole

C Ionic bonding

D London forces

(2)

1.3 The statements below refer to the atom bonded to hydrogen in molecules for which there is hydrogen bonding between the molecules.

The atom bonded to hydrogen must:

(i) be large in size.

(ii) be highly electronegative.

(iii) have at least one lone pair of electrons.

Which of the above statements are TRUE?

A (ii) only

B (ii) and (iii) only

C (i) and (iii) only

D (i), (ii) and (iii)

(2)

1.4 Which ONE of the following substances has the highest boiling point?

- 
- A CO_2
B NH_3
C CH_4
D H_2O

(2)
[2 X 4 = 8]

QUESTION 2 (Start on a new page.)

The letters **A** to **F** in the table represent SIX substances:

A	H_2	B	N_2	C	NH_3
D	CH_4	E	HCN	F	LiF

2.1 Define the term *chemical bond* in words. (2)

2.2 Write down the letter that represents the following:

2.2.1 A molecule that has only covalent bonds between its atoms and is non-polar. (1)

2.2.2 A non-polar molecule with polar bonds. (1)

2.3 Write down the:

2.3.1 The shape of the molecule in substance **D**. (1)

2.3.2 Lewis structure for the molecule in substance **E**. (2)

2.4 Use electronegativity difference to identify the type of bond between Li and F in substance **F**. (3)

2.5 Write down the Lewis structure for the molecule in substance **B** and use this structure to explain why substance **B** is unreactive at room temperature and normal pressures. (3)

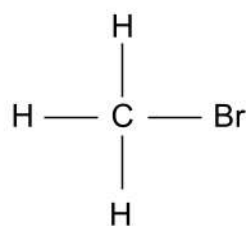
2.6 Substance **C** forms a dative covalent bond when reacting with the H^+ ion.

2.6.1 NAME the ion formed. (1)

2.6.2 State TWO requirements for the formation of dative covalent bonds. (2)
[16]

QUESTION 3 (Start on a new page.)

A learner investigates bond energies in two similar compounds:



Bromomethane

Refer to the table of bond energies below:

Bond	Bond Energy ($\text{kJ}\cdot\text{mol}^{-1}$)
$\text{C} - \text{Cl}$	340
$\text{C} - \text{Br}$	280

- 3.1 Define the term *bond energy* in words. (2)
- 3.2 Explain the difference in bond energies between the $\text{C} - \text{Cl}$ and $\text{C} - \text{Br}$ bonds. downloaded from Stanmorephysics.com (3)
- 3.3 A sample of chloromethane (CH_3Cl) has a mass of 5,05 g.
The TOTAL energy required to break all bonds in the sample is 157 kJ.

Calculate the bond energy of the $\text{C} - \text{H}$ bond in $\text{kJ}\cdot\text{mol}^{-1}$. (5)
- 3.4 Determine the energy required to break all bonds in 1 mole of bromomethane (CH_3Br). (2)

[12]

QUESTION 4 (Start on a new page.)

The table below shows the vapour pressures at the same temperature for four substances:

Substances	Vapour Pressure (kPa)
F_2	120
Cl_2	85
HCl	110
HF	15

- 4.1 Define the term *vapour pressure* in words. (2)
- 4.2 Fully explain the difference in vapour pressure between F_2 and Cl_2 . (3)
- 4.3 Although HCl has a larger molecular mass than HF , HF has a lower vapour pressure. Explain this observation. (3)
- 4.4 Which substance in the table has the highest boiling point? (1)
- 4.5 The solubility of HCl and Cl_2 in water is compared.
- 4.5.1 Define the term *solubility* in words. (2)
- 4.5.2 Which substance HCl or Cl_2 is more soluble in water? Explain the answer. (3)

[14]**TOTAL: 50**

DATA FOR PHYSICAL SCIENCES GRADE 11

CHEMISTRY

TABLE 1: PHYSICAL CONSTANTS

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

TABLE 2: FORMULAE

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

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)	
2,1 1 H 1																	2 He 4	
1,0 3 Li 7	1,5 4 Be 9											2,0 5 B 11	2,5 6 C 12	3,0 7 N 14	3,5 8 O 16	4,0 9 F 19	10 Ne 20	
0,9 11 Na 23	1,2 12 Mg 24											1,5 13 Al 27	1,8 14 Si 28	2,1 15 P 31	2,5 16 S 32	3,0 17 Cl 35,5	18 Ar 40	
0,8 19 K 39	1,0 20 Ca 40	1,3 21 Sc 45	1,5 22 Ti 48	1,6 23 V 51	1,6 24 Cr 52	1,5 25 Mn 55	1,8 26 Fe 56	1,8 27 Co 59	1,8 28 Ni 59	1,9 29 Cu 63,5	1,6 30 Zn 65	1,6 31 Ga 70	1,8 32 Ge 73	2,0 33 As 75	2,4 34 Se 79	2,8 35 Br 80	36 Kr 84	
0,8 37 Rb 86	1,0 38 Sr 88	1,2 39 Y 89	1,4 40 Zr 91		41 Nb 92	1,8 42 Mo 96	1,9 43 Tc 98	2,2 44 Ru 101	2,2 45 Rh 103	2,2 46 Pd 106	1,9 47 Ag 108	1,7 48 Cd 112	1,7 49 In 115	1,8 50 Sn 119	1,9 51 Sb 122	2,1 52 Te 128	2,5 53 I 127	54 Xe 131
0,7 55 Cs 133	0,9 56 Ba 137	57 La 139	1,6 72 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	1,8 81 Tl 204	1,8 82 Pb 207	1,9 83 Bi 209	2,0 84 Po	2,5 85 At	86 Rn	
0,7 87 Fr	0,9 88 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

Electronegativity
Elektronegatiwiteit

Symbol
Simbool

Approximate relative atomic mass
Benaderde relatiewe atoommassa

29
1,9
Cu
63,5

KEY/SLEUTEL

Atomic number

Atoomgetal

Electronegativity
ElektronegatiwiteitSymbol
SimboolApproximate relative atomic mass
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MARKING GUIDELINE

JUNE 2026

Stanmorephysics.com

MARKS: 50

DURATION: 2 hours

This marking guidelines consists of 4 pages.

QUESTION 1:

- | | | |
|-----|------|------------|
| 1.1 | C ✓✓ | (2) |
| 1.2 | B ✓✓ | (2) |
| 1.3 | B ✓✓ | (2) |
| 1.4 | D ✓✓ | (2) |
| | | [8] |

QUESTION 2

- 2.1 A mutual attraction between two atoms ✓ resulting from the simultaneous attraction between their nuclei and outer electrons. ✓ (2)

- 2.2.1 A ✓ OR B OR D (1)

- 2.2.2 D ✓ (1)

- 2.3.1 Tetrahedral ✓ (1)

2.3.2



- 2.4 Compound F: $\Delta \text{En} = 4 - 1$ ✓
 $= 3$ ✓

Ionic bond ✓ (3)

2.5



N_2 has a (strong) triple bond between its atoms. ✓
Large amounts of energy are required to break these bonds. ✓ (3)

- 2.6.1 Ammonium ✓ (1)

- 2.6.2 An atom with a lone pair of electrons. ✓
An atom with an empty orbital. ✓ (2)

[16]

QUESTION 3

3.1 Energy needed to break one mole of its molecules ✓ into separate atoms. ✓ (2)

3.2 The bromine atom is larger than chlorine/ The chlorine atom is smaller than bromine. ✓

The bond length of the C – Cl is shorter than C – Br ✓

The C – Cl bond is stronger than the C – Br bond/ The shorter bond length results in a higher bond energy. ✓ (3)

$$\begin{aligned} 3.3 \quad n(\text{CH}_3\text{Cl}) &= \frac{m}{M} \\ &= \frac{5,05}{50,5} \\ &= 0,1 \text{ mol} \end{aligned}$$

Energy required to break 1 mol of $\text{CH}_3\text{Cl} = 157 \times 10 \checkmark = 1570 \text{ g} \cdot \text{mol}^{-1}$

$$1570 = 3X + 340 \checkmark$$

$$X = 410 \text{ kJ} \cdot \text{mol}^{-1} \checkmark$$



(5)

3.4 **POSITIVE MARKING FROM 3.3**

$$\text{Energy} = 3 \times 410 + 280 \checkmark$$

$$= 1510 \text{ kJ} \cdot \text{mol}^{-1} \checkmark$$

(2)

[12]

QUESTION 4

4.1 The pressure exerted by a vapour at equilibrium with its liquid in a closed system. ✓✓ (2)

4.2 Cl_2 has a larger molecular mass/surface area ✓ than F_2 .

Cl_2 has stronger intermolecular forces/ london forces/ dispersion forces ✓ than F_2 .

More energy is required to overcome the intermolecular forces in Cl_2 , ✓ resulting in a lower vapour pressure. (3)

4.3 HF has hydrogen bonding between its molecules whereas HCl has dipole-dipole bonds between its molecules ✓.

HF has stronger intermolecular forces than HCl ✓

More energy is required to overcome the intermolecular forces in HF, ✓ resulting in HF having a lower vapour pressure. (3)

4.4 HF/ hydrogen fluoride ✓

(1)

4.5.1 The property of a solid, liquid or gaseous chemical substance (solute) to dissolve in a solid, liquid or gaseous solvent to form a homogeneous solution. ✓✓ (2)

4.5.2 HCl ✓
Strength of the intermolecular forces between HCl molecules is similar to those between water molecules. ✓✓ (3)

TOTAL: [14]
50

