



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

SEKHUKHUNE SOUTH DISTRICT

NATIONAL
SENIOR CERTIFICATE

GRADE 11



PHYSICAL SCIENCES: CHEMISTRY P2

PRE JUNE EXAMINATION

2024

Stanmorephysics.com

MARKS : 50

TIME : 1 HOUR(S)

This question paper consists of 5 pages and 1 data sheet

INSTRUCTIONS AND INFORMATION

1. Write your name on the top of your ANSWER PAGE.
2. Answer ALL the questions on your ANSWER BOOK.
3. You may use a non-programmable calculator.
4. You may use appropriate mathematical instruments.
5. Number the answers correctly according to the numbering system used in this QUESTION PAPER.
6. YOU ARE ADVISED TO USE THE ATTACHED DATA SHEETS.
7. Give brief motivations, discussions, et cetera where required.
8. Round off your final numerical answers to a minimum of TWO decimal places.

QUESTION 3 (Start on a NEW page)

3.1 Ammonia (NH₃) forms a dative covalent bond with the hydrogen ion (H⁺).

3.1.1 What is a dative covalent bond? (2)

3.1.2 Name TWO requirements for the formation of a dative covalent bond. (2)

3.1.3 By means of a Lewis diagram, show the formation of NH₄⁺. (3)

3.2 The valence shell electron repulsion theory (VSEPR) is used to predict geometrical shape of molecules. Write down the shape of the following molecules.

3.2.1 HCN (1)

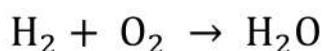
3.2.2 NH₃ (1)

3.2.3 CF₄ (1)

[10]

QUESTION 4 (Start on a NEW page)

Consider the following reaction of the formation of water.



The boiling points of the substances in the reaction are as follows:

SUBSTANCE	BOILING POINT (°C)
H ₂	-252,9
O ₂	-183
H ₂ O	100

4.1 Define the term *boiling point*. (2)

4.2 Refer to the intermolecular forces and explain the difference in boiling point between H₂O and O₂. (4)

4.3 Which substance in the table will have the highest vapour pressure? (1)

4.4 Explain your answer in QUESTION 4.3 above. Refer to the type and relative strength of the intermolecular forces. (4)

4.5 Write down the FORMULA of the substance in the table that will have the highest melting point. (1)

[12]

TOTAL MARKS: 50



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QUESTION 1

MULTIPLE-CHOICE

- 1.1 A ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 A ✓✓ (2)

[10]

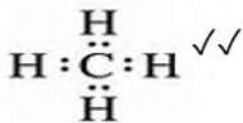
QUESTION 2

2.1

2.1.1 The sharing of electrons✓ between (two) atoms (to form a molecule). ✓ (2)

2.1.2

(a)



(2)

(b)



(2)

2.1.3

(a) 4 ✓

1)

(b) 2 ✓

(1)

2.2.1 The tendency of an atom in a molecule. ✓ to attract bonding electrons closer to itself. ✓ (2)

2.2.2 (a) ΔEN (between C and O) =1 ✓ (1)

(b) ΔEN (between H and O) =1,4 ✓ (1)

- 2.2.3
- The bonds in both molecules are polar ✓ due to the difference in electronegativities ✓ between C and O and H and O.
 - The shape of the H₂O molecule is angular ✓ and therefore the molecule is polar ✓ because one side of the molecule can be positive and the other side negative
 - The shape of the CO₂ molecule is linear ✓ and thus it is non-polar because the charge distribution is symmetrical. ✓ (6)

[18]

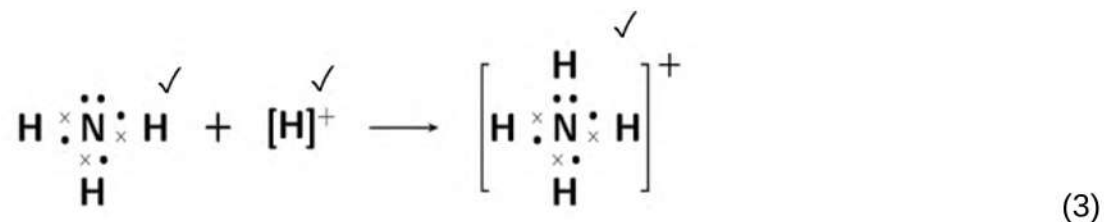
QUESTION 3

3.1

3.1.1 Dative covalent bond is a bond that occurs when both the electrons in the shared pair come from a lone pair of electrons. ✓✓ (2)

- 3.1.2
- One atom must have an empty valence shell. ✓
 - The other atom must have a lone pair of electrons. ✓ (2)

3.1.3



3.2

3.2.1 Linear ✓ (1)

3.2.2 Trigonal pyramidal ✓ (1)

3.2.3 Tetrahedral ✓ (1)

[10]

QUESTION 4

4.1 Boiling point is the temperature at which the vapour pressure of a substance equals atmospheric pressure. ✓✓ (2)

- 4.2
- H_2O has hydrogen bonds between their molecules. ✓
 - O_2 has induced-dipole/London forces between their molecules. ✓
 - H_2O has stronger intermolecular forces than O_2 . ✓
 - More energy is required to overcome/separate stronger forces of H_2O than that of O_2 . ✓

OR

- O_2 has weaker intermolecular forces than H_2O . ✓
- Less energy is required to overcome weaker forces in O_2 . ✓ (4)

4.3 H_2 ✓ (1)

- 4.4
- Both H_2 and O_2 has weaker London forces than stronger hydrogen bonds in H_2O . ✓ (4)
 - H_2 is a smaller molecule/has a lesser molecular mass/has a smaller surface area than O_2 . ✓
 - The smaller the molecule, the weaker the intermolecular force. ✓
 - Therefore, less energy is required to overcome the intermolecular forces in H_2 than O_2 . ✓

4.5 H_2O ✓ (1)

[12]

TOTAL MARK: 50