

SAMPLE PAPER



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 2 Chemistry

91164 (2.4): Demonstrate understanding of bonding, structure, properties and energy changes

Credits: Five

Check that you have been supplied with the resource sheet for Chemistry 91164 (2.4).

You should answer ALL parts of ALL questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–9 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO YOUR TEACHER AT THE END OF THE ALLOTTED TIME.

You are advised to spend 60 minutes answering the questions in this booklet.

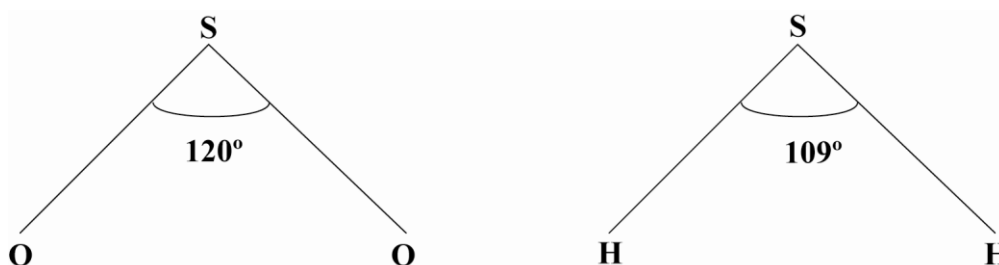
QUESTION ONE

(a) Complete the table below by:

- drawing the Lewis structure (electron dot diagram) for each molecule
- drawing a diagram to show the shape of each molecule
- naming the shape of each molecule.

Molecule	Lewis structure	Diagram of shape	Name of shape
PH ₃			
CO ₂			
H ₂ CO			

(b) The shapes of the two molecules SO₂ and H₂S are shown in the diagram below. The shape of both molecules is described as **bent**.



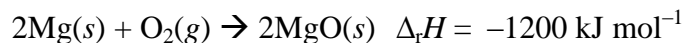
Explain why the bond angles in these two molecules are different. In your answer, you should make reference to the arrangement of electrons.

QUESTION TWO

- (a) Complete the table below by naming the type of solid and the type of particle found in each named substance in its solid state.

Solid	Type of solid	Type of particle
Mg (magnesium)		
O ₂ (oxygen)		
MgO (magnesium oxide)		

- (b) Magnesium burns in oxygen to produce magnesium oxide. The equation for the chemical reaction is represented by:

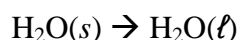


- (i) Calculate how much energy is released when 15.4 g of oxygen gas reacts.

- (ii) Calculate the mass of magnesium that must react to release 98.2 kJ of energy.

QUESTION THREE

- (a) Ice melting to form water can be represented by the following equation:

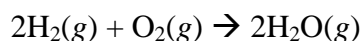


Circle the term below that best describes this reaction.

Exothermic**Endothermic**

Give reasons for your choice.

- (b) The reaction between hydrogen gas and oxygen gas to form water in the gaseous state can be represented by:



- (i) When this reaction occurs, bonds are broken and bonds are formed.

State which bonds are broken and which bonds are formed.

Bonds broken: _____

Bonds formed: _____

- (ii) The bond breaking and bond forming processes above can be described as
- EITHER exothermic OR endothermic**
- .

State which process is exothermic and which process is endothermic.

Exothermic: _____ Endothermic: _____

Explain your answer.
