

## Year 11 Chemistry HSC

### Sample Questions

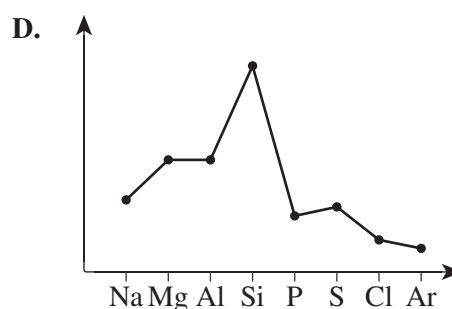
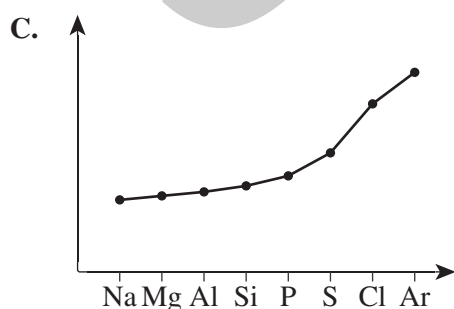
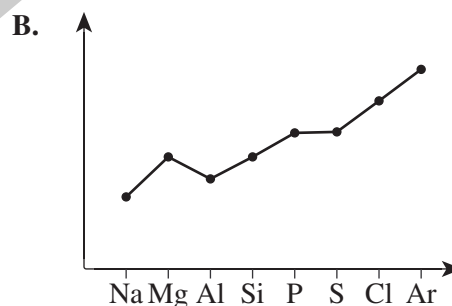
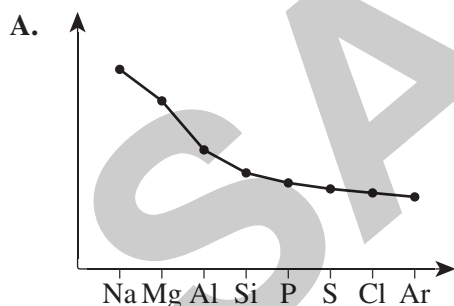
This is NOT a complete sample examination paper.

This document shows the layout of the 2019 Year 11 Chemistry HSC Diagnostic Topic Tests and provides some sample questions from the tests.

#### TEST 2 SAMPLE QUESTIONS

##### Question 1

Which one of the following graphs shows the trends of electronegativity across a period?



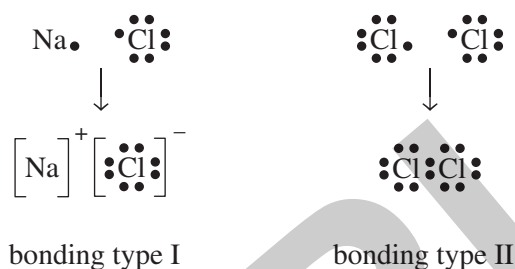
**Question 2**

An element from which of the following groups is most likely to have a vigorous reaction with water?

- A. Group 1
- B. Group 3
- C. Group 5
- D. Group 6

**Question 3** (5 marks)

The following diagram shows two types of bonding.



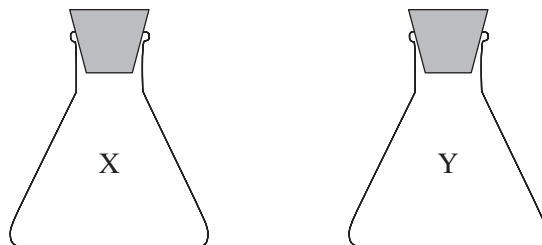
- a. Identify the type of diagrams used to show the bonding and formulae involved in the above diagram. 1 mark
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- b. i. What type of bonding is shown in bonding type I? 1 mark
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- ii. What type of bonding is shown in bonding type II? 1 mark
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- c. Complete the following table by identifying the species present in the diagram above. 2 marks

Formula	Name
Na	sodium atom
Na <sup>+</sup>	
Cl	
Cl <sup>-</sup>	
Cl <sub>2</sub>	

## TEST 4 SAMPLE QUESTIONS

### Question 1

The diagram below shows two identical sealed flasks: X and Y. X contains 2.00 g of carbon dioxide (CO<sub>2</sub>) gas and Y contains 1.27 g of an unknown gas. The gases in both flasks are at 25°C and 100 kPa.



Which one of the following gases does flask Y contain?

- A. CH<sub>4</sub>
- B. SO<sub>2</sub>
- C. N<sub>2</sub>
- D. Cl<sub>2</sub>

### Question 2

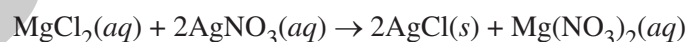
A student prepared four solutions of sodium chloride (NaCl) in water.

Which one of the following solutions will have the highest concentration measured in mol L<sup>-1</sup>?

- A. 75 g of sodium chloride in 250 mL of water
- B. 25 g of sodium chloride in 100 mL of water
- C. 25 g of sodium chloride in 600 mL of water
- D. 3.0 g of sodium chloride in 15 mL of water

### Question 3 (3 marks)

When a solution of magnesium chloride is added to a solution of silver nitrate, an insoluble solid (precipitate) is one of the products. The reaction is shown in the following equation:



An excess of 0.100 mol L<sup>-1</sup> silver nitrate solution was added to 50.0 mL of 0.100 mol L<sup>-1</sup> magnesium chloride solution.

- a. Why was an excess of silver nitrate solution added? 1 mark

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- b. Calculate the mass of the precipitate formed. 2 marks

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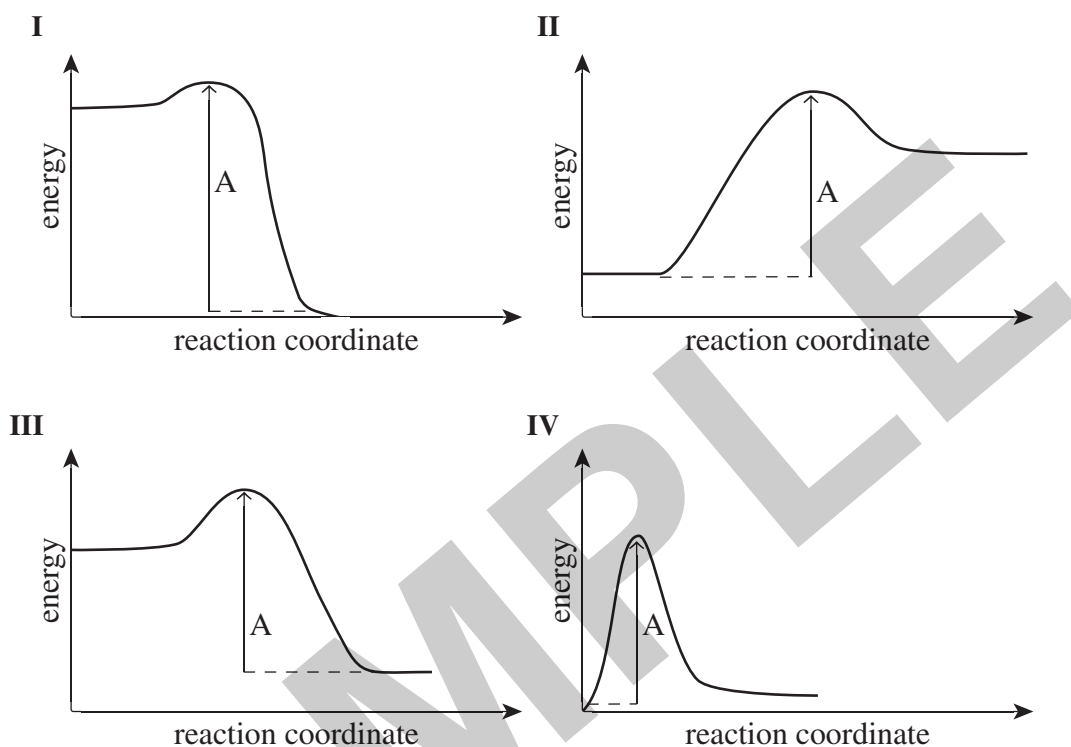


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## TEST 6 SAMPLE QUESTIONS

### Question 1

Consider the energy profile diagrams below.



Which of the following statements about the above energy profile diagrams is correct?

- A. The energy value represented by arrow A is always the activation energy for the forward reaction.
- B. The reactant in diagram II would make a good fuel.
- C. The reaction in diagram III is endothermic.
- D. The energy profile of the reaction in diagram I could represent an unstable compound.

### Question 2 (4 marks)

Explain why the rate of a chemical reaction is dependent on temperature using the collision theory.

4 marks

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**TEST 8 SAMPLE QUESTIONS****Question 1**

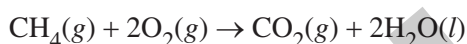
$\Delta G$  for the process  $C_{\text{diamond}} \rightarrow C_{\text{graphite}}$  is  $-3\text{kJ mol}^{-1}$  at room temperature.

Which one of the following statements is correct?

- A. Diamonds are not stable at room temperature.
- B. The process is spontaneous but incredibly slow at room temperature.
- C. The process is not spontaneous.
- D. The enthalpy change for  $C_{\text{diamond}} \rightarrow C_{\text{graphite}}$  is a huge positive value.

**Question 2 (5 marks)**

Natural gas is predominantly methane. The equation for the combustion of methane is shown below.



- a. Calculate the enthalpy of combustion of methane gas. 1 mark

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- b. Calculate the entropy change that occurs during the combustion of methane after all products have been returned to their original (room) temperature. 1 mark

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- c. Calculate the change in the Gibbs free energy during the process when the products have returned to their original (room) temperature. 1 mark

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- d. A mixture of methane and atmospheric oxygen is known to be completely stable. Explain this in regards to the value for  $\Delta G$  obtained above. 2 marks

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**END OF SAMPLE QUESTIONS**