Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1_Thermodynamics

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Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Q1.

Which equation represents the process that occurs when the standard enthalpy of atomisation of iodine is measured?

A $\frac{1}{2}\ I_2(s) \rightarrow I(g)$ ⬭

B $I_2(s) \rightarrow 2I(g)$ ⬭

C $\frac{1}{2}\ I_2(g) \rightarrow I(g)$ ⬭

D $I_2(g) \rightarrow 2I(g)$ ⬭

(Total 1 mark)

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Q2.

Lattice enthalpy values can be obtained from Born–Haber cycles and by calculations based on a perfect ionic model.

Which compound shows the greatest percentage difference between these two values?

A CsF ⬭

B CsI ⬭

C LiF ⬭

D LiI ⬭

(Total 1 mark)

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Q3.

This question is about silver iodide.

(a) Define the term enthalpy of lattice formation.

_____

_____

_____

(2)

(b) Some enthalpy change data are shown in the table.

	Enthalpy change / kJ mol^{-1}
$AgI(s) \longrightarrow Ag^+(aq) + I^-(aq)$	+112
$Ag^+(g) \longrightarrow Ag^+(aq)$	−464
$I^-(g) \longrightarrow I^-(aq)$	−293

Use the data in the table to calculate the enthalpy of lattice formation of silver iodide.

Enthalpy of lattice formation = _____ kJ mol^{-1}

(2)

(c) A calculation of the enthalpy of lattice formation of silver iodide based on a perfect ionic model gives a smaller numerical value than the value calculated in part (b)

Explain this difference.

_____

_____

_____

_____

(2)

(d) Identify a reagent that could be used to indicate the presence of iodide ions in an aqueous solution and describe the observation made.

Reagent _____

Observation _____

_____

(2)

(Total 8 marks)

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Q4.

Titanium(IV) chloride can be made from titanium(IV) oxide as shown in the equation.

$$TiO_2(s) + 2C(s) + 2Cl_2(g) \rightarrow 2CO(g) + TiCl_4(l) \qquad \Delta H^{\ominus} = -60.0 \text{ kJ mol}^{-1}$$

Some entropy data are shown in the table.

Substance	$TiO_2(s)$	$C(s)$	$Cl_2(g)$	$CO(g)$	$TiCl_4(l)$
$\mathbf{S^{\ominus} / J\,K^{-1}\,mol^{-1}}$	50.2	5.70	223	198	253

Use the equation and the data in the table to calculate the Gibbs free-energy change for this reaction at 989 °C

Give your answer to the appropriate number of significant figures.

Use your answer to explain whether this reaction is feasible.

Gibbs free-energy change _____ kJ mol^{-1}

Explanation _____

_____

(Total 6 marks)

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