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

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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

C

[1]

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Q2.

(a) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$ **1**

(b) $S^-(g)$ **1**

(c) The negative S^- ion **1**

repels the electron being added **1**

(d) (i) Enthalpy of atomisation of sulphur **1**

(ii) Second ionisation enthalpy of calcium **1**

(iii) Second electron affinity of sulphur **1**

(e) Electron more strongly attracted **1**

nearer to the nucleus or attracted by Ca^+ ion **1**

(f) Correct cycle

e.g. + 178 + 279 + 590 +1145 – 200 + E – 3013 + 482 = 0 **1**

= 539 **1**

Allow one mark for – 539

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Q3.

(a) (i) Δ*H* atomisation/sublimation of magnesium

1

(ii) Bond/dissociation enthalpy of Cl-Cl

OR 2 × *H* atomisation of chlorine

1

(iii) Second ionisation enthalpy of magnesium

1

(iv) 2 × electron affinity of chlorine

1

(v) Lattice formation enthalpy of $MgCl_2$

1

(b) Equation $2MgCl(s) \rightarrow MgCl_2(s) + Mg(s)$

State symbols not required but penalise if incorrect

1

Calculation Δ*H* reaction = $\Sigma\Delta H_f$ products – $\Sigma\Delta H_f$ reactants

1

= – 653 – (2 × –133)

1

= – 427 ($kJmol^{-1}$)

Allow +427 to score (1) mark

Other answers; award (1) for a correct ΔH reaction expression

1

(c) Δ*H* soln $MgCl_2$ = – Δ*H* Lat.form. + Δ*H* hyd.Mg^{2+} + 2Δ*H* hyd.Cl^-

1

or cycle

= 2502 – 1920 – (2 × 364)

1

= – 146 ($kJmol^{-1}$)

Allow + 146 to score (1) mark

Other answers; award (1) for a correct ΔH soln $MgCl_2$ expression/cycle

1

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