

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.



(b) (i) Enthalpy change for formation of 1 mol of substance
 Allow heat energy change, NOT energy 1

From its elements 1

Reactants and products/all substances in their standard states
 Or normal states at 298 K, 1 bar (100 kPa) 1



(iii) $\Delta H_f(\text{CaF}_2) = \Delta H_a(\text{Ca}) + 1\text{st IE}(\text{Ca}) + 2^{\text{nd}} \text{IE}(\text{Ca}) + \text{BE}(\text{F}_2) +$
 $2 \times \text{EA}(\text{F}) - \Delta H_L(\text{CaF}_2)$
 Or labelled diagram 1

$= 193 + 590 + 1150 + 158 + (2 \times -348) - 2602$ 1

$= -1207 \text{ kJ mol}^{-1}$
 Correct answer scores 3
 -842 scores 2 (transfer error)
 -859 scores 1 only (using one E.A.)
 Units not required, wrong units lose 1 mark 1

(c) Electrostatic attraction stronger/ionic bonding stronger/attraction
 between ions stronger/more energy to separate ions
 Molecular attraction/atoms/intermolecular forces $\text{CE}=0$ 1

Because fluoride (ion) smaller than chloride
 Do not allow F or fluorine 1

(d) (i) $\Delta H = \Delta H_L + \Sigma \Delta H_{\text{hyd}} = 2237 - 1650 + (2 \times -364)$
 Can be on cycle/diagram 1

$= -141 \text{ kJ mol}^{-1}$

Correct answer scores 2

Units not required, wrong units lose 1 mark

1

(ii) Decreases

If ans to (d)(i) positive allow increases

1

Reaction exothermic/ ΔH –ve

If (d)(i) +ve allow endothermic/ ΔH + ve

1

(Equilibrium) shifts to left/backwards

(as temperature rises)/equilibrium

opposes the change

If (d) (i) +ve allow shifts to right/forwards/equilibrium opposes the change

If no answer to (d) (i) assume –ve ΔH used

If effect deduced incorrectly from any ΔH CE = 0 for these 3 marks

1

(e) u.v. absorbed: electrons/they move to higher energy
(levels)/electrons excited

1

visible light given out: electrons/they fall back down/move to
lower energy (levels)

Must refer to absorbing u.v. NOT visible light or this must be implied.

1

[17]