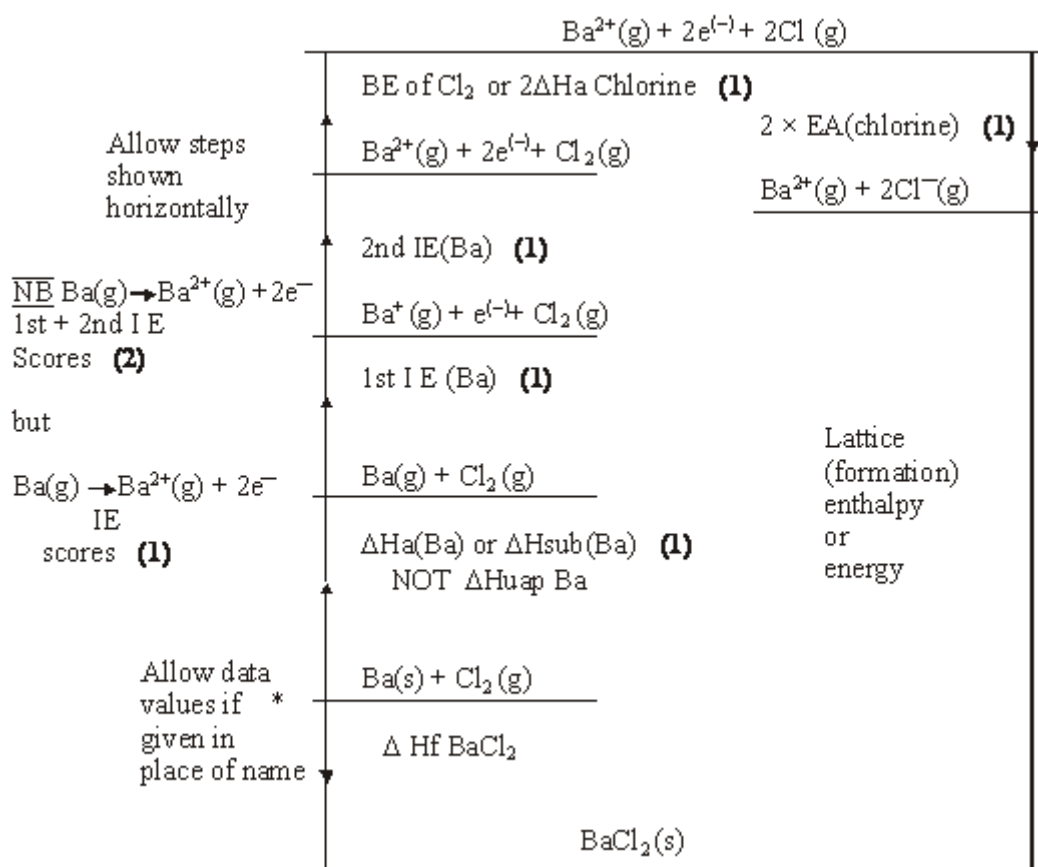


M1. (a) (i)



ONLY consider species involved in the step marked

(ii) Cycling clockwise about (*)

CE if step missing

$$\Delta H_f Ba + 1^{st} IE Ba + 2^{nd} IE Ba + 2\Delta H_a Cl + 2EA Cl + LE - \Delta H_f BaCl_2 = 0 \quad (1)$$

$$+180 + 503 + 965 + 2 \times 122 + 2EA - 2056 + 859 = 0 \quad (1)$$

$$EA = -695/2 = - (347 \text{ to } 348) \quad (1)$$

Ignore units

Calculation -1 for each error

Mark conseq.

Notes: -695 scores **(2)**

+ (347 to 348) scores **(2)**

- (286 to 287) scores **(2)**

+ (286 to 287) scores **(1)**

-573 scores **(1)**

+573 scores **(0)**

(b) $\Delta S = \Sigma S \text{ products} - \Sigma S \text{ reactants}$
 $= (63 + 223) - 124 = 162$ (1)

$\Delta G = \Delta H - T\Delta S$ or $\Delta H = T\Delta S$ or $T = \Delta H/\Delta S$ (1)
or used correctly

$\Delta H = 859 \times 10^3$ (1) = $T \times 162$

$T = (5\,300 \text{ to } 5304)$ K (1)

Penalise if units °C

-1 for each error + mark conseq.

4

[13]

M2.D

[1]

M3.D

[1]