

| Question | Answers  | Additional Comments/Guidance   | Mark        |
|----------|--|--|-------------|
| 01.1     |  | One mark for each level with correct state symbols   | 1<br>1<br>1 |
| 01.2     | $\Delta_f H = \Delta_a H (\text{Mg}) + \frac{1}{2} \Delta_{\text{BD}} H (\text{O}_2) + \Delta_{1\text{st IE}} H (\text{Mg}) + \Delta_{2\text{nd IE}} H (\text{Mg}) +$ $\Delta_{1\text{st EA}} H (\text{O}) + \Delta_{2\text{nd EA}} H (\text{O}) + \Delta_{\text{LE}} H (\text{MgO})$ $- 602 = 150 + (\frac{1}{2} \times 496) + 736 + 1450 - 142 + 844 + \Delta_{\text{LE}} H (\text{MgO})$ $\Delta_{\text{LE}} H (\text{MgO}) = -3888 / -3890 \text{ (kJ mol}^{-1}\text{)}$ | Allow answers to 2sf or more<br>1 mark for +3888 or +3890<br>1 mark for -4136 or -4140 (not 496 x 1/2) | 1<br>1<br>1 |
| Total    |  |  | 6           |