**Marks
3**

- Draw the potential energy diagram for an endothermic reaction. Indicate on the diagram the activation energy for both the forward and reverse reaction, and the enthalpy of reaction.

4

- Consider the reaction: $NO_2(g)$ + $CO(g)$ $\rightarrow$ $NO(g)$ + $CO_2(g)$

  The experimentally determined rate equation is: Rate = $k[NO_2(g)]^2$

  Show the rate expression is consistent with the following mechanism:

Step 1	$2NO_2(g)$ $\rightleftharpoons$ $N_2O_4(g)$		fast
Step 2	$N_2O_4(g)$ $\rightarrow$ $NO(g)$ + $NO_3(g)$		slow
Step 3	$NO_3(g)$ + $CO(g)$ $\rightarrow$ $NO_2(g)$ + $CO_2(g)$		fast