Question 26 **(9 marks)**

Consider the following system that is at equilibrium. Cobalt(II) chloride is dissolved in concentrated hydrochloric acid. The colour of the solution at initial equilibrium is blue.

$$\underset{\text{blue}}{CoCl_4^{2+}(aq)} + 6\ H_2O(l) \leftrightharpoons \underset{\text{pink}}{Co(H_2O)_6^{2+}(aq)} + 4\ Cl^-(aq) \qquad \Delta H = \text{-ve}$$

For each of the applied changes after equilibrium is re-established, predict the:

- shift in equilibrium position (left, right or no change)
- rate of the forward reaction compared to the original rate (increase, decrease or no change)
- colour of the reaction mixture.

Do **not** use arrows to show direction.

Change	**Shift in equilibrium position (left, right or no change)**	**Rate of the forward reaction compared to the original rate (increase, decrease or no change)**	**Colour of reaction mixture**
A few drops of $AgNO_3(aq)$ are added			
A small volume of water is added			
The system is heated			