5.   Heat $CoCl_4^{2-}(aq) \rightleftharpoons Co(H_2O)_6^{2+}(aq)$ (Test tubes D, F).
According to Le Chatelier, the endothermic reaction is favoured ∴ the reverse reaction is favoured ∴ solution turns blue, since [$CoCl_4^{2-}(aq)$] increases.

6.   Cool $CoCl_4^{2-}(aq) \rightleftharpoons Co(H_2O)_6^{2+}(aq)$ (Test tubes E, G).
According to Le Chatelier, the exothermic reaction is favoured ∴ the forward reaction is favoured ∴ solution turns pink, since [$Co(H_2O)_6^{2+}(aq)$] increases.

Conclusions:
Both hypotheses are correct.

Exercise 17: Page 298

1.   If an equilibrium in an isolated system is disturbed by changing one of the conditions of equilibrium (temperature, concentration or pressure), the system reacts to counteract the change and achieve a new equilibrium.

2.1   a.   Disturbing factor: increase in temperature
            The reaction that leads to decrease in temperature by using energy will be favoured.
            The forward, endothermic reaction is favoured.
            The [$H_2O(g)$] decreases; [$CO(g)$] and [$H_2(g)$] increases.

        b. K_C value changes only if there is a ΔT. The forward reaction is favoured ∴ K_C value increases.

2.2   a.   Steam is $H_2O(g)$. Disturbing factor is an increase in [$H_2O(g)$].
            The reaction that leads to a decrease in the [$H_2O(g)$] will be favoured.
            Therefore the forward reaction is favoured.
            The [$H_2O(g)$] decreases; [$CO(g)$] and [$H_2(g)$] increase.
            NOTE: If the quantity of $H_2O(g)$ increases, the pressure will also increase. If p increases, the reverse reaction will be favoured. Which factors have the greatest influence? The increase in the [$H_2O(g)$] has the greatest influence for this situation.

        b. K_C value remains unchanged, only ΔT changes K_C value.

2.3   a. $p(g) \propto {}^1/_{volume(g)}$
            The disturbing factor is the pressure on the reaction system, which decreases.
            The reaction that leads to an increase in pressure, will be favoured ($p(g) \propto n(g)$).
            Therefore the reaction that leads to an increase in quantity of (mol) gas, is favoured.
            The forward reaction is favoured (1 mol (g) $\rightleftharpoons$ 2 mol (g)).
            ∴ [$H_2O(g)$] decreases; [$CO(g)$] and [$H_2(g)$] increase.

        b. K_C value remains unchanged, only ΔT changes K_C value.

2.4 a.   Carbon is a solid and therefore has no effect on the equilibrium position.

     b.   The equilibrium is not disturbed, therefore K_C value remains unchanged. Only ΔT K_C value can change.

2.5 a.   The rate of the forward and reverse reaction increases equally when a suitable catalyst is added to a reaction system. The equilibrium is reached faster, but does not shift.

     b.   Only ΔT has an effect on K_C value $\therefore$ K_C value remains the same.

2.6 $K_C = \dfrac{[CO][H_2]}{[H_2O]}$

3.1 Double arrow: dynamic equilibrium is reached.

3.2 The forward and reverse reactions occur simultaneously and at the same rate. They are equally fast so that there is no observable change at macroscopic level.

3.3 $[C\ell^-] = [Na^+]$; the $NaC\ell$ dissociates in water and forms ions in a ratio of 1:1. This causes the ions of the two species to have the same concentration.

3.4 The quantity of undiluted $NaC\ell$ on the bottom remains the same.

3.5 Insoluble $AgC\ell(s)$ forms – not completely sunk to the bottom.

3.6 $Ag^+(aq) + C\ell^-(aq) \rightarrow AgC\ell(s)$ or $AgC\ell(\downarrow)$
                 white deposit

3.7 Ag^+ ions bond with the $C\ell^-$ ions in the solution to form a deposit. The $[C\ell^-]$ decreases. Disturbing factor is therefore the decrease in $[C\ell^-]$.
The reaction that leads to increase in the $[C\ell^-]$ will be favoured.
The forward reaction is favoured.
More $NaC\ell(s)$ is dissolved.

4.1.1 $K_C = \dfrac{[C]^2[D]}{[A][B]^2}$

        $= \dfrac{(0,38)^2(0,1)}{(0,5)(0,3)^2}$

        $= 0,32$

4.1.2 $K_C = \dfrac{[C]^2[D]}{[A][B]^2}$

        $= \dfrac{(0,28)^2(0,29)}{(0,55)(0,4)^2}$

        $= 0,26$