**Marks 5**

- For the reaction $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ at 25 °C

  $\Delta H° = -198.4$ kJ mol$^{-1}$ and $\Delta S° = -187.9$ J K$^{-1}$ mol$^{-1}$

  Show that this reaction is spontaneous in the forward direction at 25 °C.

If the volume of the reaction system is increased at 25 °C, in which direction will the equilibrium move?

Calculate the value of the equilibrium constant, $K_p$, at 25 °C.

$K_p$ =

Assuming $\Delta H°$ and $\Delta S°$ are independent of temperature, in which temperature range is the reaction non-spontaneous?

Answer: