Marks 4

- The following data were obtained for the reaction of iodine atoms in the gas phase in the presence of argon.

$$2I(g) + Ar(g) \rightarrow I_2(g) + Ar(g)$$

Experiment Number	Initial [I] (M)	Initial [Ar] (M)	Initial Reaction Rate $-d[I(g)]/dt$ ($M\ s^{-1}$)
1	1.0×10^{-5}	1.0×10^{-3}	8.70×10^{-4}
2	2.0×10^{-5}	1.0×10^{-3}	3.48×10^{-3}
3	2.0×10^{-5}	5.0×10^{-3}	1.74×10^{-2}

Derive an expression for the rate law for the formation of $I_2(g)$ and calculate the value of the rate constant for this reaction.

Rate law:

Rate constant:

Calculate the rate of appearance of $I_2(g)$ when $[I(g)] = 1.0 \times 10^{-3}$ M and $[Ar(g)] = 1.0 \times 10^{-2}$ M.

Answer: