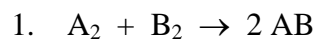


## Reaction Order and Rate Law Expression Worksheet

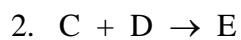
Given the following equations and experimental data, write the correct

- a. Rate Law Expression
- b. Reaction Order
- c. Determine k, the Specific Rate Constant (including units)



Exp #	[A <sub>2</sub> ]	[B <sub>2</sub> ]	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1	0.001	0.001	0.01
2	0.001	0.002	0.02
3	0.001	0.003	0.03
4	0.001	0.004	0.04
5	0.002	0.004	0.16
6	0.003	0.004	0.36

- a. Rate =  $k[A]^2[B]$
- b. Third order
- c.  $k = 1.0 \times 10^7 \text{ dm}^6 \text{ mol}^{-2} \text{ s}^{-1}$



Exp #	[C]	[D]	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1	0.1	0.01	0.02
2	0.1	0.02	0.04
3	0.1	0.03	0.06
4	0.1	0.04	0.08
5	0.2	0.04	0.08
6	0.3	0.04	0.08

- a. Rate =  $k[D]$
- b. First order
- c.  $k = 2 \text{ s}^{-1}$



Exp #	[F]	[G]	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1	0.01	0.4	0.02
2	0.02	0.4	0.04
3	0.03	0.4	0.06
4	0.1	0.2	5
5	0.1	0.4	10
6	0.1	0.6	15

- Rate =  $k[F][G]$
- Second Order
- $k = 5 \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$



Exp #	[C]	[D]	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1	0.1	0.01	0.02
2	0.1	0.02	0.08
3	0.1	0.03	0.18
4	0.1	0.04	0.32
5	0.2	0.04	1.28
6	0.3	0.04	2.88

- Rate =  $k[C]^2[D]^2$
- Fourth order
- $k = 2 \times 10^4 \text{ dm}^9 \text{ mol}^{-3} \text{ s}^{-1}$



Exp #	[F]	[G]	Rate (mole dm <sup>-3</sup> s <sup>-1</sup> )
1	0.01	0.4	0.02
2	0.02	0.4	0.16
3	0.03	0.4	0.54
4	0.1	0.2	5
5	0.1	0.4	20
6	0.1	0.6	45

- Rate =  $k[F]^3[G]^2$
- Fifth order
- $k = 1.25 \times 10^5 \text{ dm}^{12} \text{ mol}^{-4} \text{ s}^{-1}$