**Tutorial 1**

1. The experimental rate law for the reaction between NO2 and CO to produce NO and CO2 is:

**Rate = k [NO2]2**. The reaction is believed to occur via two steps:

**Step 1:** NO2 + NO2 → NO + NO3 **Step 2:** NO3 + CO → NO2 + CO2

1. What is the equation for the overall reaction?

………………………………………………………………………………………………………

1. What is the intermediate?

………………………………………………………………………………………………………

1. Does this reaction contain a catalyst? (Yes/No).
2. What can you say about the relative rates of steps 1 and 2?

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1. The overall order of the reaction between A and B according to the following rate data is:

|  |  |  |  |
| --- | --- | --- | --- |
| **Run** | **[A]o** | **[B]o** | **[Rate]o** |
| **1** | 1.00 M | 1.00 M | 1.25 x 10-2 M/s |
| **2** | 1.00 M | 2.00 M | 2.50 x 10-2 M/s |
| **3** | 2.00 M | 2.00 M | 2.50 x 10-2 M/s |

|  |  |  |  |
| --- | --- | --- | --- |
| * 1. Zero
 | * 1. First
 | * 1. Second
 | * 1. Third
 |

1. If you want to determine the reaction order with respect to A and B for a reaction with the following rate law: **Rate= K[A]m[B]n,** which of the following three initial setups would you choose:
2. 0.1M and 0.1M/0.2M and 0.3M/0.5M and 0.2M
3. 0.01M and 0.01M/0.01M and 0.02M/0.01M and 0.03M
4. 0.01M and 0.01M/0.02M and 0.02M/0.03M and 0.03M
5. 0.1M and 0.1M/0.2M and 0.1M/0.1M and 0.2M