Unit I Learning Log: Reaction Kinetics

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Intentions** | **Practice** | **Evidence** | **Test Review** |
| A1: demonstrate awareness that reactions occur at differing rates   * Give examples of reactions proceeding at different rates * Recognize that rate is described in terms of some quantity per unit of time   A2: experimentally determine rate of a reaction   * Identify properties that could be monitored in order to determine a reaction rate * Recognize some of the factors that control reaction rates * Compare and contrast factors affecting the rates of both homogeneous and heterogeneous reactions * Describe situations in which the rate of reaction must be controlled * Calculate the rate of a reaction using experimental data | I.1 #1 – 6  I.2 #7 – 9,  I.3 #10 – 17  I.4 #18 – 19  Problem Set #2 | Quiz #1  Lab 18B | Multiple Choice: 9, 10, 12, 14, 15, 20, 23, 24, 27, 33, 34, 38, 43, 48, 49, 55, 56  Written: 4, 7, 11, 14, 17, 18 |
| A3: demonstrate knowledge of collision theory   * Identify the following principles as aspects of collision theory: reactions are the result of collisions between reactant particles; not all collisions are successful; sufficient KE and favourable geometry are required; to increase the rate of a reaction, one must increase the frequency of successful collisions; energy changes are involved in reactions as bonds are broken and formed; a KE distribution curve can explain how changing temperature or adding a catalyst changes the rate   A5: apply collision theory to explain how reaction rates can be changed   * Use collision theory to explain the effect of the following factors on reaction rate: nature of reactants, concentration, temperature, surface area | I.5 #20 – 22  Problem Set #3 | Quiz #1 | Multiple Choice: 22, 25, 28, 29, 31, 35, 39, 40, 44, 50, 51, 52, 57  Written: 2, 3, 12, 15, 16, 19 |
| A4: describe the energies associated with reactants becoming products   * Describe the activated complex in terms of its potential energy, stability, and structure * Define activation energy * Correctly describe the relationship between activation energy and rate of reaction * Describe the changes in PE and KE as reactant molecules approach each other * Draw and label PE diagrams including H, activation energy, and the energy of the activated complex * Relate the sign of H to whether the reaction is exothermic or endothermic * Write chemical equations that describe energy effects as a chemical equation that includes the energy term and a chemical equation using H notation | I.6 #23 – 28  I.7 #29 – 32  I.8 #33 – 45  Problem Set #4 | Quiz #2 | Multiple Choice: 1, 2, 3, 4, 5, 13, 19, 21, 26, 30, 32, 36, 41, 45, 58, 59  Written: 9, 10, 13, 20 |
| A6: analyse the reaction mechanism for a reacting system   * Explain why most reactions involve more than one step * Describe a reaction mechanism as the series of steps the result in the overall reaction and describe the role of the rate-determining step * Explain the significance and role of a catalyst * Identify reactant, product, reaction intermediate, activated complex, and catalyst from a given reaction mechanism | I.9 #46 – 53  I.10 # 54 – 55 | Quiz #2 | Multiple Choice: 11, 37, 42, 46, 60  Written: 1, 5, 6, 8 |
| A7: represent graphically the energy changes associated with catalyzed and uncatalyzed reactions   * Compare the PE diagrams for a catalyzed and uncatalyzed reaction in terms of: reactants, products, activated complex, reaction intermediates, reaction mechanism, H, activation energy | I.11 + I.12 #56 – 61 |  | Multiple Choice: 16, 17, 18, 47, 53, 54  Written: |
| A8: describe the uses of specific catalysts in a variety of catalysts   * Identify platinum in automobile catalytic converters as a catalyst | I.13 #62 – 63 |  | Multiple Choice:  Written: |