# What is Reaction Rate and Kinetics?

Worksheet

Reaction rate is [concentration]/t, typically in mol/(Ls). Kinetics examines how fast reactions proceed and what factors control their speed.

$$r = \frac{\Delta [\text{Reactant}]}{\Delta t}$$

## Questions

1. 0.5 mol/L of reactant consumed in 25 s. Rate?

A) 0.02 mol/(Ls)
B) 0.05 mol/(Ls)
C) 0.2 mol/(Ls)
D) 50 mol/(Ls)

2. Which is NOT a factor affecting reaction rate?

A) Temperature
B) Concentration
C) Catalyst
D) Colour of reactants

3. A fast reaction has a high rate because

A) It releases energy
B) Reactants collide more successfully per time
C) Products are heavier
D) It is exothermic

4. Instantaneous rate differs from average rate because

A) Temperature is different
B) Concentration changes continuously
C) Pressure varies
D) Time unit is different

5. A reaction consumes 0.8 mol/L of reactant in 40 seconds. What is the reaction rate?

6. In the first 10 s, [A] drops from 1.5 to 0.9 mol/L. Rate?

7. A decomposition reaction produces 0.3 mol/L of product in 15 minutes. Average rate?

8. Define: What is reaction rate?

9. Define: What is chemical kinetics?

10. Define: Units of reaction rate?

# Answer Key

1. A) 0.02 mol/(Ls) - r = 0.5 / 25 = 0.02 mol/(Ls).
2. D) Colour of reactants - Colour doesn't affect the rate mechanism.
3. B) Reactants collide more successfully per time - Rate depends on frequency and success of collisions.
4. B) Concentration changes continuously - Average is c/t over an interval; instantaneous is the slope at one moment.
5. r = [concentration]/t r = 0.8 / 40 = 0.02 mol/(Ls)
6. r = [A]/t r = (1.5 - 0.9) / 10 = 0.6 / 10 = 0.06 mol/(Ls)
7. Convert: 15 min = 900 s r = 0.3 / 900 = 0.000333 mol/(Ls) 3.3 10^-4 mol/(Ls)
8. The speed at which reactants are consumed or products form: [concentration]/t in mol/(Ls).
9. The study of reaction rates and reaction mechanisms - how fast and why reactions proceed.
10. mol/(Ls) or M/s (molarity per second).