Worksheet: Chemical Kinetics

ICSE · Class 12 · Chemistry · 11 questions · 34 marks

Name: _____ Date: _____ Score: _____ / 34

Q1. For the reaction N2 + 3H2 gives 2NH3, ammonia is formed at 0.06 mol/L/s. Find the rate of the reaction and the rate at which hydrogen is consumed. *[2 marks]*

Q2. A reaction has rate constant 3.2 x 10^-4 L mol-1 s-1. What is its order, and why? *[2 marks]*

Q3. A first order reaction has a half-life of 20 minutes. What fraction of the reactant remains after one hour? *[2 marks]*

Q4. A first order reaction is 20% complete in 10 minutes. Calculate the rate constant and the time for 75% completion. *[3 marks]*

Q5. For a reaction A + B gives products, doubling [A] doubles the rate and doubling [B] leaves it unchanged. Write the rate law and state the overall order. *[3 marks]*

Q6. The rate constant of a reaction is 1.5 x 10^-3 per second at 300 K and 6.0 x 10^-3 per second at 320 K. Calculate the activation energy. *[3 marks]*

Q7. A zero order reaction has k = 0.02 mol/L/s and an initial concentration of 0.5 mol/L. Find the half-life and the time for the reaction to go to completion. *[3 marks]*

Q8. A reaction has an activation energy of 209 kJ/mol and a rate constant of 1.6 x 10^-5 per second at 600 K. At what temperature will the rate constant be 100 times larger? *[4 marks]*

Q9. For the reaction 2NO + O2 gives 2NO2, doubling [NO] at fixed [O2] multiplies the rate by four, and doubling [O2] at fixed [NO] doubles it. Write the rate law, give the overall order and the units of k, and comment on the molecularity. *[4 marks]*

Q10. For the gas-phase first order decomposition X(g) gives 2Y(g) at constant volume, the initial pressure of X is 0.4 atm and the total pressure after 300 s is 0.55 atm. Calculate the rate constant. *[4 marks]*

Q11. For a reaction with a rate law Rate = k[A]^2[B]^-1, describe how the rate changes when [A] is doubled and [B] is tripled simultaneously. *[4 marks]*