CHEM 1423
Chapters 16
Homework Answers

TEXTBOOK HOMEWORK

16.15 $Rate = -\frac{1}{2}\frac{\Delta[D]}{\Delta t} = -\frac{1}{3}\frac{\Delta[E]}{\Delta t} = -\frac{\Delta[F]}{\Delta t} = +\frac{1}{2}\frac{\Delta[G]}{\Delta t} = \frac{\Delta[H]}{\Delta t}$

$\frac{\Delta[H]}{\Delta t} = 0.05\,Ms^{-1}$

16.27 (a) Orders w.r.t. A, B and C are: 1 , 2 , 0

(b) k = 50. M^{-2} s^{-1}

16.31 t = 6.67 s

16.32 [AB] = 0.38 M

16.47 k = 0.033 s^{-1}

16.48 E_a = 140 kJ/mol , A = 1.84×10^{11}

16.50 (a) See Text HW Solutions

(b) ΔH_{rxn} = +40 kJ/mol

16.52 (a) See Text HW Solutions

(b) E_a(rev) = +3 kJ/mol

16.60 (a) $Cl_2 + 2\ NO_2 \rightarrow 2\ NO_2Cl$

(b) Cl is a reaction intermediate

(c) (1) Bimolecular $R_1 = k_1[Cl_2][NO_2]$ Slow
(2) Bimolecular $R_2 = k_2[Cl][NO_2]$ Fast

(d) Yes

16.72 (a) Rate increases by factor of 2.5

(b) Rate decreases by factor of 2

(c) Rate decreases by factor of 100

(d) Rate unchanged

16.75 t = 57. yr

SUPPLEMENTARY HOMEWORK

S1. C

S2. C

S3. A

S4. $R = 1.65 \times 10^{-7}$ M min^{-1}

S5. (a) $k = 1.17 \times 10^{-3}$ $M^{-1}s^{-1}$

(b) $[A]_t = 0.24$ M

(c) t = 475 s

S6. (a) $k = 1.33 \times 10^{-3}$ min^{-1}

(b) $[A]_t = 0.27$ M

(c) t = 740 min

S7. (a) k = 1.54 µM hr^{-1}

(b) $[A]_t = 15.4$ µM

(c) t = 9.75 hr

S8. $R = k_2 K \dfrac{[Tl^{3+}][Hg_2^{2+}]}{[Hg^{2+}]}$

S9. (a) $\varepsilon = 5640\ M^{-1}\ cm^{-1}$

(b) $c = 4.36 \times 10^{-5}\ M$

(c) %T = 37.8%

S10. $k' = 143\ M^{-1}s^{-1}$

S11. C

S12. (a) $v_o = 0.33V_m$

(b) $[S]/K_M = 0.67$

(c) $v_o = 88.2\ \mu M$