

**Quiz 2 Answer Keys – Solutions worked out below**  
**Chem 1B – Ortony**  
**Spring 2009**

Form A

1. A or E (because there was a typo in the answer to A) (5 pts)
2. C (5 pts)
3. A (3 pts)
4. E (3 pts)
5. A (3 pts)
6. A (3 pts)

Form B

1. D (5 pts)
2. D (5 pts)
3. E (3 pts)
4. A (3 pts)
5. E (3 pts)
6. D (3 pts)



USE THESE DATA FOR QUESTIONS 3-6:

A general reaction written as  $2A + 2B \rightarrow C + 2D$  is studied and yields the following data.

	[A] <sub>0</sub>	[B] <sub>0</sub>	Initial $\Delta[C]/\Delta t$
RATE 1	0.100 M	0.100 M	$4.00 \times 10^{-5}$ mol/L · s
RATE 2	0.200 M	0.100 M	$4.00 \times 10^{-5}$ mol/L · s
RATE 3	0.100 M	0.200 M	$8.00 \times 10^{-5}$ mol/L · s

3. What is the order of the reaction with respect to B? (3 pts)

- (A) 1  
 (B) 4  
 (C) 3  
 (D) 2  
 (E) 0

$$\text{RATE} = k[A]^n[B]^m$$

$$\text{RATE 1: } 4.00 \times 10^{-5} \text{ M/sec} = k(0.1 \text{ M})^n(0.1 \text{ M})^m$$

$$\text{RATE 3: } 8.00 \times 10^{-5} \text{ M/sec} = k(0.1 \text{ M})^n(0.2 \text{ M})^m$$

(DOUBLE [B],  
RATE DOUBLES)

$$\frac{\text{RATE 1}}{\text{RATE 3}}: \frac{1}{2} = \frac{k(0.1 \text{ M})^n(0.1 \text{ M})^m}{k(0.1 \text{ M})^n(0.2 \text{ M})^m}, \frac{1}{2} = \frac{1}{2^m}, \boxed{m=1}$$

4. What is the order of the reaction with respect to A? (3 pts)

- (A) 1  
 (B) 4  
 (C) 3  
 (D) 2  
 (E) 0

$$\frac{\text{RATE 1}}{\text{RATE 2}}: \frac{4 \times 10^{-5} \text{ M/sec}}{4 \times 10^{-5} \text{ M/sec}} = \frac{k(0.1 \text{ M})^n(0.1 \text{ M})^m}{k(0.2 \text{ M})^n(0.1 \text{ M})^m}$$

$$1 = \left(\frac{1}{2}\right)^n, \boxed{n=0} \rightarrow \text{(DOUBLE [A], RATE DOESN'T CHANGE)}$$

5. What are the proper units for the rate constant for the reaction? (3 pts)

- (A)  $\text{s}^{-1}$   
 (B)  $\text{mol L}^{-1} \text{s}^{-1}$   
 (C)  $\text{L mol}^{-1} \text{s}^{-1}$   
 (D)  $\text{L}^3 \text{mol}^{-3} \text{s}^{-1}$   
 (E)  $\text{L}^2 \text{mol}^{-2} \text{s}^{-1}$

$$\text{RATE 1: } 4.00 \times 10^{-5} \text{ M/sec} = k(0.1 \text{ M})^2$$

$$\text{UNITS: } \frac{\text{M}}{\text{SEC}} = ? \text{ M}$$

$$\boxed{\frac{1}{\text{SEC}}}$$

6. What is the numerical value of the rate constant? (3 pts)

- (A)  $4.00 \times 10^{-4}$   
 (B)  $4.00 \times 10^{-3}$   
 (C)  $4.00 \times 10^{-2}$   
 (D)  $4.00 \times 10^{-1}$   
 (E) none of these

$$4.00 \times 10^{-5} \text{ M/sec} = k(0.1 \text{ M})$$

$$k = 4.00 \times 10^{-4} \text{ sec}^{-1}$$