Series N°5

Exercise N° 1:

I- Consider the reaction and its rate law given below 2 A(g) + B(g) → C(g)

Rate = $k[A]^2[B]$, at the beginning of one trial of this reaction, [A] = 4.0 and [B] = 1.0.

The rate of formation of C was 0.048 mole L^{-1} sec^{-1}

1- Give the numerical value of k, the rate constant for this reaction.

2- Which is the label for k, the rate constant?

3- When [B] decreases 0.4 M, what will be the value of [A]?

II- The first order decomposition of some radioactive isotope is 3 days. What percentage of the original substance will have decayed after 12 days have passed?

III- For the reaction A+2B→2CA+2B→2C, the rate of reaction is 1.75 x 10^{-5} M s^{-1} at the time when [A]=0.3575M.

a. What is the rate of formation of C?

b. What will [A] be 1 minute later?

c. Assume the rate remains at 1.75 x 10-5M s^{-1}. How long would it take for [A] to change from 0.3580 to 0.3500M?

Exercise N° 2:

exp	Initial [A] (mol L^{-1})	Initial [B] (mol L^{-1})	Initial rate of formation of [C] (mol L^{-1} sec^{-1})
1	0.10	0.10	2.5×10^{-4}
2	0.20	0.10	5.0×10^{-4}
3	0.20	0.50	1.25×10^{-2}

The initial-rate data in the table above were obtained for the reaction represented below.

1. What is the experimental rate law for the reaction A + B ⇔ 2 C

Exercise N° 3:

I- Given the data below for the reaction of the decomposition of iodoethane into ethane and hydrogen iodide,

a- Calculate the activation energy for the reaction.

T (K)	**k (s^{-1})**
660	$7.2 * 10^{-4}$
680	$2.2 * 10^{-3}$
720	$1.7 * 10^{-2}$
760	0.11

b- What is the value of the rate constant at 400 °C?

II- Which sets of data correspond to a:

a. Zero order reaction

b. First order reaction

c. Second order reaction

I		**II**		**III**	
Time(s)	[A]**, M**	**Time(s)**	[B]**, M**	**Time(s)**	[C]**, M**
25	1	0	5	0	2.23
50	0.85	25	2.5	25	1.82
75	0.70	50	1.67	50	1.49
100	0.55	75	1.25	75	1.21
125	0.40	100	1	-	-
150	0.25	-	-	-	-
200	0.10	-	-	-	-

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