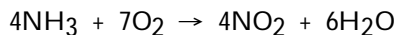


Name _____

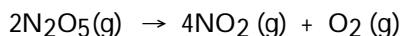
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Which substance in the reaction below either appears or disappears the fastest? 1) _____



- A) H_2O
- B) O_2
- C) NO_2
- D) NH_3
- E) The rates of appearance/disappearance are the same for all of these.

- 2) At elevated temperatures, dinitrogen pentoxide decomposes to nitrogen dioxide and oxygen: 2) _____



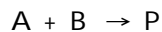
When the rate of formation of NO_2 is 5.5×10^{-4} M/s, the rate of decomposition of N_2O_5 is _____ M/s.

- A) 2.8×10^{-4}
- B) 2.2×10^{-3}
- C) 1.4×10^{-4}
- D) 10.1×10^{-4}
- E) 5.5×10^{-4}

- 3) A reaction was found to be second order in carbon monoxide concentration. The rate of the reaction _____ if the $[\text{CO}]$ is doubled, with everything else kept the same. 3) _____

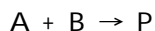
- A) is reduced by a factor of 2
- B) remains unchanged
- C) doubles
- D) increases by a factor of 4
- E) triples

- 4) The kinetics of the reaction below were studied and it was determined that the reaction rate increased by a factor of 9 when the concentration of B was tripled. The reaction is _____ order in B. 4) _____



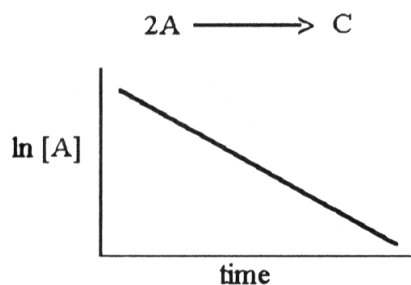
- A) zero
- B) first
- C) second
- D) third
- E) one-half

The data in the table below were obtained for the reaction:



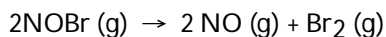
Experiment Number	[A] (M)	[B] (M)	Initial Rate (M/s)
1	0.273	0.763	2.83
2	0.273	1.526	2.83
3	0.819	0.763	25.47

- 5) The order of the reaction in A is _____.
 A) 1 B) 2 C) 3 D) 4 E) 0 5) _____
- 6) The order of the reaction in B is _____.
 A) 1 B) 2 C) 3 D) 4 E) 0 6) _____
- 7) The overall order of the reaction is _____.
 A) 1 B) 2 C) 3 D) 4 E) 0 7) _____
- 8) For a first-order reaction, a plot of _____ versus _____ is linear.
 A) $\ln [A]_t, t$ B) $t, \frac{1}{[A]_t}$ C) $\frac{1}{[A]_t}, t$ D) $[A]_t, t$ E) $\ln [A]_t, \frac{1}{t}$ 8) _____
- 9) The graph shown below depicts the relationship between concentration and time for the following chemical reaction. 9) _____



- The slope of this line is equal to _____.
 A) k B) $-1/k$ C) $1/k$ D) $\ln[A]_0$ E) $-k$
- 10) At elevated temperatures, nitrogen dioxide decomposes to nitrogen oxide and oxygen: 10) _____
- $$NO_2(g) \rightarrow NO(g) + \frac{1}{2}O_2(g)$$
- The reaction is second order in NO_2 with a rate constant of $0.543 \text{ M}^{-1} \text{ s}^{-1}$ at 300°C . If the initial $[NO_2]$ is 0.260 M , it will take _____ s for the concentration to drop to 0.150 M .
 A) 1.01 B) 3.34 C) 5.19 D) 0.299 E) 0.0880

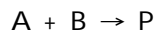
11) The reaction 11) _____



is a second-order reaction with a rate constant of $0.80\text{ M}^{-1}\text{s}^{-1}$ at $11\text{ }^\circ\text{C}$. If the initial concentration of NOBr is 0.0440 M , the concentration of NOBr after 7.0 seconds is _____.

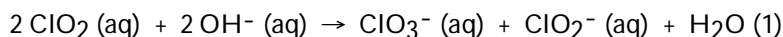
- A) 0.0276 M B) 0.0402 M C) 0.0353 M D) 0.0480 M E) 0.0324 M

12) The kinetics of the reaction below were studied and it was determined that the reaction rate did not change when the concentration of B was tripled. The reaction is _____ order in B. 12) _____



- A) zero B) first C) second D) third E) one-half

The data in the table below were obtained for the reaction:



Experiment Number	$[\text{ClO}_2]\text{ (M)}$	$[\text{OH}^-\text{ (M)}$	Initial Rate (M/s)
1	0.060	0.030	0.0248
2	0.020	0.030	0.00276
3	0.020	0.090	0.00828

13) What is the order of the reaction with respect to ClO_2 ? 13) _____
A) 1 B) 4 C) 0 D) 2 E) 3

14) What is the order of the reaction with respect to OH^- ? 14) _____
A) 0 B) 1 C) 2 D) 3 E) 4

15) What is the overall order of the reaction? 15) _____
A) 1 B) 3 C) 2 D) 0 E) 4

16) What is the magnitude of the rate constant for the reaction? 16) _____
A) 115 B) 4.6 C) 1.15×10^4 D) 713 E) 230

17) The rate law for a reaction is 17) _____

$$\text{rate} = k[\text{A}][\text{B}]^2$$

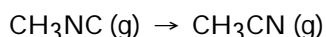
Which one of the following statements is false?

- A) The reaction is second order in B.
B) k is the reaction rate constant
C) The reaction is second order overall.
D) The reaction is first order in A.
E) If $[\text{B}]$ is doubled, the reaction rate will increase by a factor of 4.

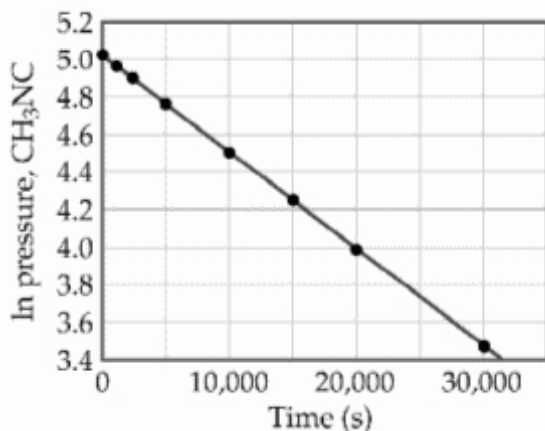
18) Under constant conditions, the half-life of a first-order reaction _____ 18) _____
A) can be calculated from the reaction rate constant
B) does not depend on the initial reactant concentration
C) is constant
D) is the time necessary for the reactant concentration to drop to half its original value
E) All of the above are correct.

19) One difference between first- and second-order reactions is that _____ 19) _____
A) a first-order reaction can be catalyzed; a second-order reaction cannot be catalyzed
B) the half-life of a first-order reaction does not depend on $[A]_0$; the half-life of a second-order reaction does depend on $[A]_0$
C) the rate of a first-order reaction depends on reactant concentrations; the rate of a second-order reaction does not depend on reactant concentrations
D) the rate of both first-order and second-order reactions do not depend on reactant concentrations
E) None of the above are true.

20) At elevated temperatures, methylisonitrile (CH_3NC) isomerizes to acetonitrile (CH_3CN): 20) _____



The reaction is first order in methylisonitrile. The attached graph shows data for the reaction obtained at 198.9 °C.



The rate constant for the reaction is _____ s^{-1} .

- A) $+5.2 \times 10^{-5}$
- B) -5.2×10^{-5}
- C) $+1.9 \times 10^4$
- D) -1.9×10^4
- E) $+6.2$