

Name: \_\_\_\_\_ SID: \_\_\_\_\_ Seat No.: \_\_\_\_\_ Room: \_\_\_\_\_

1. Which one of the following substances would exhibit dipole-dipole intermolecular forces?

- A.  $\text{CCl}_4$                       B.  $\text{Cl}_2$                       C.  $\text{N}_2$                       D.  $\text{NCl}_3$

2. Of the gases, Ne,  $\text{N}_2$ ,  $\text{O}_2$ , and  $\text{SiH}_4$ , which one would you expect to be easiest to liquefy (turn from gas to liquid)?

- A. Ne                      B.  $\text{N}_2$                       C.  $\text{O}_2$                       D.  $\text{SiH}_4$

3. Which of the following molecules would exhibit hydrogen bonding in the liquid state?

- A.  $\text{CH}_4$                       B.  $\text{H}_2$                       C.  $\text{NH}_3$                       D.  $\text{CH}_3\text{F}$

4. Which of the following would be expected to have the highest melting point?

- A. LiBr                      B. LiF                      C. LiCl                      D. NaCl

5. Which of the following solids is held in the solid state primarily by induced dipole-induced dipole forces?

- A. ice    C. solid  $\text{NH}_3$  at low temperature  
B. NaCl    D.  $\text{I}_2$

6. Rank the compounds  $\text{NH}_3$ ,  $\text{CH}_4$ , and  $\text{SiH}_4$  in order of increasing boiling point.

- A.  $\text{NH}_3 < \text{CH}_4 < \text{SiH}_4$                       C.  $\text{NH}_3 < \text{SiH}_4 < \text{CH}_4$   
B.  $\text{CH}_4 < \text{NH}_3 < \text{SiH}_4$                       D.  $\text{CH}_4 < \text{SiH}_4 < \text{NH}_3$

7. Liquids with high surface tension tend to have

- A. strong intermolecular forces.  
B. strong adhesive forces.  
C. strong intramolecular forces.  
D. weak cohesive forces.

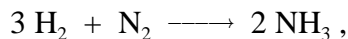




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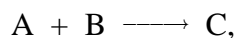
20. For the gas phase reaction,



how does the rate of disappearance of  $\text{H}_2$  compare to the rate of production of  $\text{NH}_3$  ?

- A. The initial rates are equal.  
B. The rate of disappearance of  $\text{H}_2$  is  $\frac{1}{2}$  the rate of appearance of  $\text{NH}_3$  .  
C. The rate of disappearance of  $\text{H}_2$  is  $\frac{3}{2}$  the rate of appearance of  $\text{NH}_3$  .  
D. The rate of disappearance of  $\text{H}_2$  is  $\frac{2}{3}$  the rate of appearance of  $\text{NH}_3$  .
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21. Given the initial rate data for the reaction

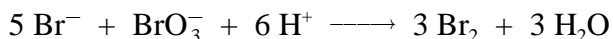


determine the rate expression for the reaction

<u>[A], M</u>	<u>[B], M</u>	<u><math>\ddot{A}[\text{C}]/\ddot{A}t</math> (initial) M/s</u>
0.10	0.20	5.00
0.20	0.20	10.0
0.10	0.15	2.81

- A.  $\ddot{A}[\text{C}]/\ddot{A}t = 1250[\text{A}][\text{B}]^2$                       C.  $\ddot{A}[\text{C}]/\ddot{A}t = 250[\text{A}]^2$   
B.  $\ddot{A}[\text{C}]/\ddot{A}t = 250[\text{A}][\text{B}]$                       D.  $\ddot{A}[\text{C}]/\ddot{A}t = 50.0[\text{A}]$
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22 The rate law for the chemical reaction



has been determined experimentally to be

$$\frac{-\Delta[\text{BrO}_3^-]}{\Delta t} = k[\text{Br}^-][\text{BrO}_3^-][\text{H}^+]^2$$

The reaction order with respect to the hydrogen ion is

- A. 1                      B. 2                      C. 6                      D.  $k[\text{H}^+]$
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23. For a first order reaction, which of the following can be plotted versus time to give a straight line?

- A.  $\ln[A]$                       B.  $\ln[1/A]$                       C.  $1/[A]$                       D.  $[A]$
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24. A student analyzed a second-order reaction and obtained the graph below but forgot to label the axes. What should the labels be for the X and Y coordinates respectively?



- A. time,  $\ln[A]$                       C. temperature,  $\ln[A]$   
B. time,  $[A]$                       D. time,  $1/[A]$
- 
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25. The reaction  $X \longrightarrow Y$  follows first-order kinetics with  $k = 0.83/\text{min}$ . If the initial concentration of X is 3.6 M, what is the concentration of X after 15 minutes?

- A. 0.046 M                      B. 0.230 M                      C.  $1.1 \times 10^{-1}$  M                      D.  $1.4 \times 10^{-5}$  M
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