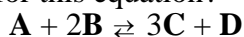
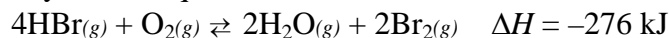


1) What is the equilibrium expression for this equation?



- (A) $\frac{[\mathbf{C}]^3 [\mathbf{D}]}{[\mathbf{A}] [\mathbf{B}]^2}$ (B) $\frac{[\mathbf{A}] [\mathbf{B}]^2}{[\mathbf{C}]^3 [\mathbf{D}]}$ (C) $\frac{[3\mathbf{C}] [\mathbf{D}]}{[\mathbf{A}] [2\mathbf{B}]}$ (D) $\frac{[\mathbf{A}] [2\mathbf{B}]}{[3\mathbf{C}] [\mathbf{D}]}$

2) Which change to this system at equilibrium will increase the concentration of $\text{Br}_{2(g)}$?



- (A) an increase in pressure
 (B) an increase in temperature
 (C) the removal of oxygen, O_2
 (D) the addition of water vapor, $\text{H}_2\text{O}_{(g)}$

3) How many sugar molecules are there in 1.00 mL of 0.100 M sugar solution?

- (A) 1.20×10^{24} (B) 6.02×10^{19} (C) 6.02×10^{23} (D) 3.01×10^{18} (E) 3.01×10^{19}

4) The number of valence electrons in the outermost shell of O is

- (A) 8 (B) 2 (C) 3 (D) 6 (E) 5

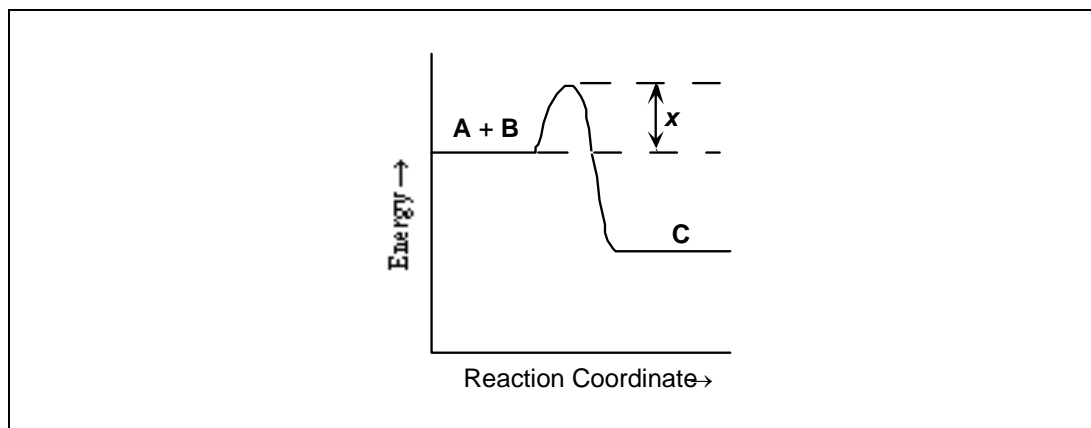
5) What is the hydrogen ion concentration, $[\text{H}^+]$, of a 0.001 M solution of sodium hydroxide, NaOH?

- (A) $1 \times 10^{-3} \text{ M}$ (C) $1 \times 10^{-11} \text{ M}$
 (B) $1 \times 10^{-9} \text{ M}$ (D) $1 \times 10^{-14} \text{ M}$

6) Which element is the *most* electronegative?

- (A) Be (B) Mg (C) Ca (D) Sr (E) Ba

7) This potential energy diagram shows that the reaction $\mathbf{A} + \mathbf{B} \rightarrow \mathbf{C}$ is



- (A) slow. (B) endothermic. (C) rapid. (D) at equilibrium. (E) exothermic.

8) When 2 g of carbon are burned to carbon dioxide, 15.75 kcal of heat energy are liberated. The heat liberated during the formation of one mole of carbon dioxide is

- (A) 65.93 kJ·mol⁻¹
- (B) 263.7 kJ·mol⁻¹
- (C) 131.9 kJ·mol⁻¹
- (D) 395.6 kJ·mol⁻¹
- (E) 197.8 kJ·mol⁻¹

9) In which pair do *both* compounds exhibit ionic bonding?

- (A) SO₂, HCl (B) KCl, CO₂ (C) KNO₃, CH₄ (D) NaCl, H₂O (E) NaF, KBr

10) Which description applies to compound **QT** if elements **Q** and **T** have a large difference in electronegativity?

- (A) Its atoms repel each other.
- (B) The bond is primarily ionic.
- (C) The bond is primarily metallic.
- (D) The bond is coordinate covalent.