

ANSWER KEY	Chapter 16 Test Answer Key	BLM 16.5.1A
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### Answers to Multiple-Choice Questions

1. b
2. c
3. c
4. d
5. a
6. d
7. d
8. c
9. d
10. a
11. a
12. b
13. c
14. b
15. d

### Answers to Numerical Response Questions

<b>16.</b> 1.4 mol/L
<b>17.</b> $K_c = 0.75$
<b>18.</b> $[I_2(g)] = 1.2 \text{ mol/L}$
<b>19.</b> $K_c = 0.15$
<b>20.</b> $[NO(g)] = 2.5 \times 10^{-3} \text{ mol/L}$
<b>21.</b> $[SF_6(g)] = 0.29 \text{ mol/L}$

### Answers to Written Response Questions

22.

$$K_c = \frac{[Fe^{2+}(aq)]^2[I_2(aq)]}{[Fe^{3+}(aq)]^2[I^-(aq)]^2}$$

23. a)  $2H_2O(l) \rightleftharpoons 2H_2(g) + O_2(g)$

b)  $K_c = [H_2(g)]^2[O_2(g)]$

c) At room temperature,  $K_c$  is very small because water does not decompose into its elements.

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24. The  $[\text{Ag}(\text{NH}_3)_2^+](\text{aq})$  ion is the more stable because  $K_c$  is very large, indicating that this complex ion is present in a much greater concentration at equilibrium than is the  $[\text{Ag}(\text{H}_2\text{O})_2^+](\text{aq})$  ion.
25. A phase equilibrium is involved:  $\text{Br}_2(l) \rightleftharpoons \text{Br}_2(g)$ . The change will be endothermic as written. When the temperature is lowered, Le Châtelier's principle predicts a shift toward the left. The concentration of bromine vapour will decrease and the colour of the vapour will be less intense.
26. When acid is added, the position of equilibrium will shift to the left, increasing the concentration of chlorine gas.
27. The addition of more methyl alcohol vapour into a rigid reaction vessel will increase the  $[\text{CH}_3\text{OH}]$ . Le Châtelier's principle predicts the position of equilibrium will shift to the left, increasing the concentration of hydrogen gas.
28. The partial pressure of  $\text{O}_2(g)$  at sea level is greater than it is at high altitude. Because the amount of oxygen dissolved in water is directly proportional to the pressure of oxygen above the solution, lakes at sea level contain more dissolved oxygen than waters at higher altitude. Diminished levels of  $\text{O}_2(\text{aq})$  in lakes at higher altitudes result in fewer fish and less variety.
29. a)  $2\text{SO}_2(g) + \text{O}_2(g) \rightleftharpoons 2\text{SO}_3(g)$        $\Delta H$  is negative (-)
- b) The yield of  $\text{SO}_3(g)$  could be increased by increasing the  $[\text{SO}_2(g)]$  or  $[\text{O}_2(g)]$ ; by removing  $\text{SO}_3(g)$ ; by running the reaction at high pressure; by lowering the temperature.
- c) The reaction is carried out at a relatively high temperature to increase the rate of the reaction.
- d) The catalyst also increases the rate of reaction.