1) B

2) A

3) A

4) C

5) C

6) B

7) B

8) C

9) B

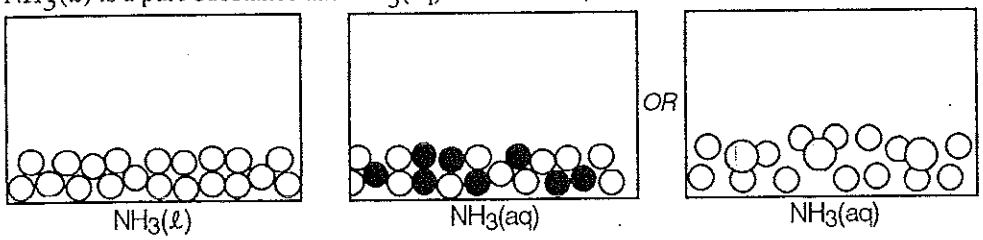
10) B

11) A

12) Answers may vary.

(a) SAMPLE ANSWERS: $NH_3(\ell)$ is pure ammonia in the liquid state and $NH_3(aq)$ is a mixture of ammonia and water. OR $NH_3(\ell)$ is a pure substance and $NH_3(aq)$ is a solution.;

(b)



13) A

14) A

15) A

16) C

17) A

18) A

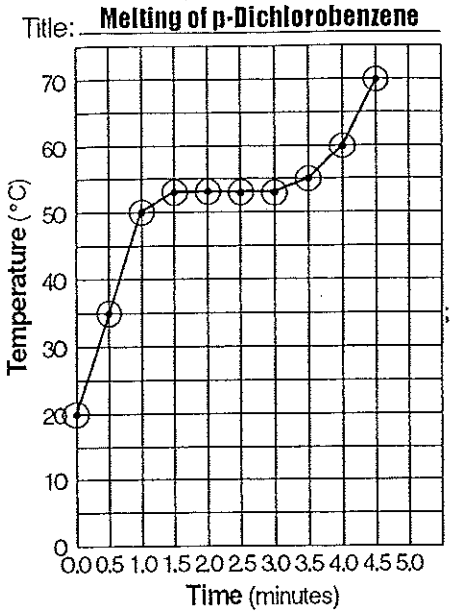
19) D

20) D

21) A

22) A

23) (a)

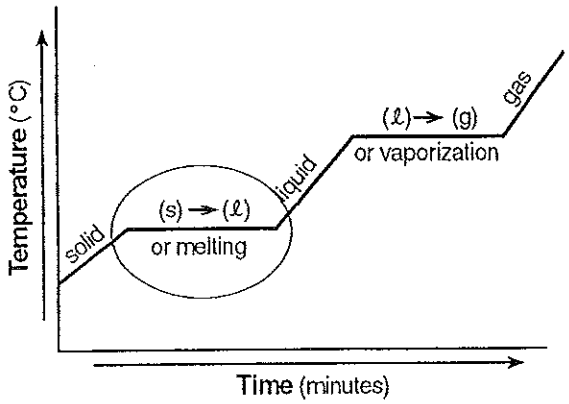


(b) Answers may vary.
SAMPLE ANSWERS: Melting of p-Dichlorobenzene OR Melting Point of p-Dichlorobenzene OR Heating Curve of p-Dichlorobenzene;

(c) 53.0° C

24) Answers may vary.
SAMPLE ANSWER: During the plateau in temperature, kinetic energy remains the same, but potential energy increases.

25)



26) B

27) B

28) B

29) B

30) C

31) C

32) A

33) A

34) B

35) A

36) B

37) Answers may vary.
(a) SAMPLE ANSWERS: As the temperature increases, the gas pressure increases. OR Temperature and gas pressure are directly related.;
(b) SAMPLE ANSWER: At higher temperatures, the gas particles have greater kinetic energy resulting in an increase in the number and the force of the collisions of the gas molecules against the walls of the container.;
(c) 114.8 kPa
WORK SHOWN: $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$, $\frac{(101.3\text{ kPa})(1.0\text{ L})}{300\text{ K}} = \frac{P_2(1.0\text{ L})}{340\text{ K}}$, $P_2 = 114.8$ kPa

38) A

39) C

40) B

41) D

42) B

43) D

44) D

45) D

46) B

47) B

48) LiCl and $BaCrO_4$

49) Answers may vary.
SAMPLE ANSWER: $BaCrO_4$ because the chromate ion forms insoluble compounds (except with Group 1 or NH_4^+).

50) lithium chromate

51) barium chloride

52) D

53) D

54) C

55) C

56) C

57) A

58) D

59) C

60) B

61) B

62) A

63) C

64) D

65) (a) 13; (b) 27; (c) 2-8-3 OR $1s^2 2s^2 2p^6 3s^2 3p^1$; (d) aluminum; (e) $\cdot\dot{\underset{\cdot}{\mathrm{Al}}}\cdot$

66) A

67) C

68) A

69) B

70) C

71) B

72) D

73) B

74) C

75) A

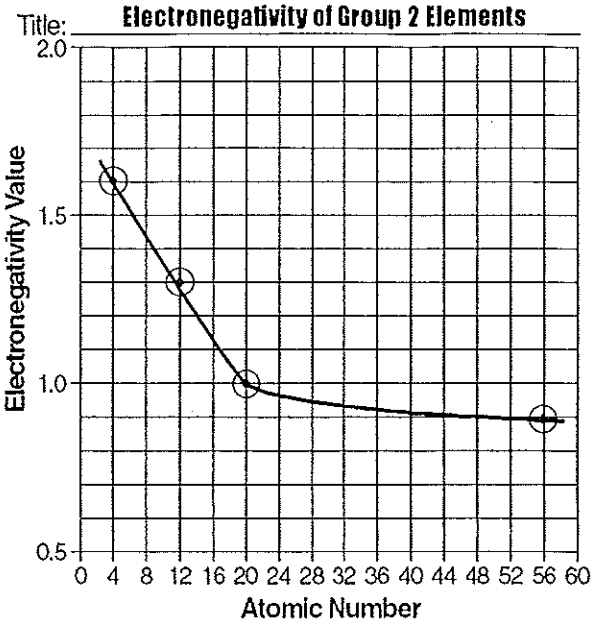
76) D

77) Mg and Ba
Answers may vary.
SAMPLE ANSWERS: They are both in the same group on the Periodic Table. OR They are both alkaline earth elements. OR They both have the same number of valence electrons.

DATA TABLE

Atomic Number	Element	Electronegativity Value
4	Be	1.6
12	Mg	1.3
20	Ca	1.0
56	Ba	0.9

78) (a-c)



;

Answers may vary.
SAMPLE ANSWERS:

(d) As the atomic number increases, the electronegativity decreases.;

(e) Electronegativity decreases within Group 2 due to an increase in the number of occupied principal energy levels. OR The valence electrons are farther from the nucleus. OR Shielding by inner electrons decreases the attraction for valence electrons.;

(f) 0.9 (±.1)

79) A

80) C

81) A

82) A

83) B

84) C

85) D

86) D

87) D

88) C

89) C

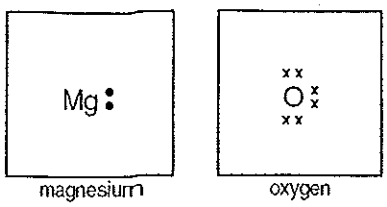
90) D

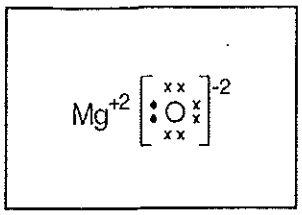
91) magnesium oxide

92) MgO

93) Answers may vary.
SAMPLE ANSWERS: ionic bond ...because magnesium is a metal and oxygen is a nonmetal. OR ...because the difference in

electronegativity values equals 2.1.

94) 

95) 

96) B

97) D

98) D

99) B

100) A

101) D

102) A

103) B

104) B

105) D

106) A

107) A

108) D

109) B

110) C

111) B

112) (a) 102.0 g
WORK SHOWN: 2(27.0) + 3(16.0) = 102.0 g;

(b) 6.00 moles
WORK SHOWN: ratio of moles Al to moles Al_2O_3 is 4:2; therefore, 6.00 moles Al are needed to produce 3.00 moles Al_2O_3;

(c) 306 g
WORK SHOWN: 3.00 moles$(\frac{102.0\text{ g}}{1.00\text{ mole}})$ = 306 g

113) D

114) C

115) D

116) A

117) A

118) (a) 101.1 g
WORK SHOWN: 39.1 + 14.0 + 3(16.0) = 101.1 g;
(b) 40. g;
(c) 0.40 moles
WORK SHOWN: 40. g × $\frac{1 \text{ mole}}{101.1 \text{ g}}$ = 0.40 moles;
(d) 4 M
WORK SHOWN: $M = \frac{\text{moles of solute}}{\text{liters of solution}}$, $M = \frac{0.40 \text{ moles}}{0.1 \text{ liters}}$ = 4 M

119) A

120) B

121) A

122) C

123) B

124) D

125) A

126) B

127) A

128) (a) Answers may vary.
SAMPLE ANSWER: The potential energy diagram represents an endothermic reaction because the PE of the products is greater than PE of the reactants.;
(b) 150 kJ;
(c) +50 kJ

129) A

130) D

131) C

132) A

133) B

134) A

135) Answers may vary.
SAMPLE ANSWER: Increasing the temperature will cause the equilibrium to shift to the right because gases are less soluble at higher temperatures.

136) Answers may vary.
SAMPLE ANSWER: Opening the can will cause the to shift to the left because $CO_2(g)$ will escape from the can.

137) A

138) A

139) A

140) B

141) B

142) D

143) B

144) C

145) D

146) A

147) D

148) (a) $HNO_3 + LiOH \longrightarrow LiNO_3 + H_2O$;
(b) 0.25 M
WORK SHOWN: $M_A V_A = M_B V_B$, $(M_A)(100.\ mL) = (0.50\ M)(50.\ mL)$, $M_A = 0.25\ M$;
(c) phenolphthalein

149) C

150) D

151) C

152) A

153) C

154) C

155) B

156) A

157) C

158) A

159) A

160) (a) $Au^{3+}(aq)$, the oxidation number of Au^{3+} is reduced;
(b) $3e^-$

161) B

162) B

163) B

164) D

165) D

166) A

167) D

168) D

169) C

170) C

171) B

172) C

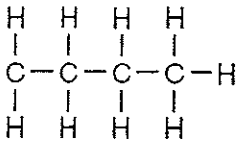
173) B

174) C

175) A

176) A

177) B

178) (a)  ; (b) alkanes; (c) $CO_2 + H_2O$

179) B

180) D

181) B

182) B

183) C

184) D

185) C

186) 10 days

WORK SHOWN: 3 half-lives evolved, 40.0 g ⟶ 20.0 g ⟶ 10.0 g ⟶ 5.0 g, $\frac{30 \text{ days}}{3} = 10 \text{ days}$

187) D

188) B

189) C

190) A

191) D

192) D

193) D

194) D

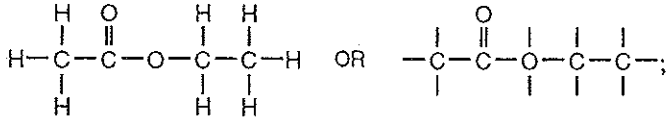
195) C

196) C

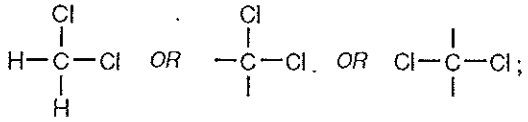
197) C

198) Answers may vary.
SAMPLE ANSWERS: the starting size (surface area) of the magnesium strips OR the concentration of the HCl(aq) OR the starting temperature of the magnesium strips OR the amount of magnesium OR the nature of the reactants OR the volume of HCL (aq) OR the absence or presence of a catalyst

199) Answers may vary.
SAMPLE ANSWERS:

(a)  OR ;

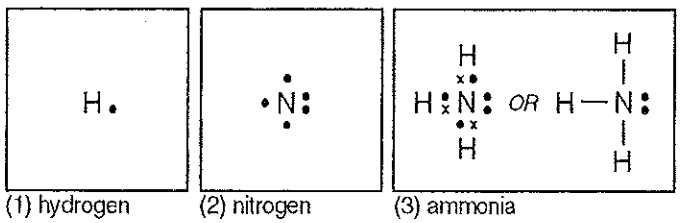
(b) esters;

(c)  OR OR ;

(d) halide;

(e) Ethyl acetate because the companies can label the beans as "naturally decafeinated". OR Ethyl acetate because it occurs naturally in orange rinds and many other fruits. OR Dichloromethane because neither of these solvents provide a process that is really "natural decaffeination". OR Dichloromethane because the ethyl acetate's "natural decafeinated label" is misleading.

(f) polar — The solvents used in the decaffeinating processes are all polar; since caffeine dissolves in all of the solvents, the caffeine must be polar. OR nonpolar — The solvents used in the decaffeinating processes are all nonpolar; since caffeine dissolves in all of the solvents, the caffeine must be nonpolar.

200) (1-2) 
(1) hydrogen (2) nitrogen (3) ammonia