

AP MULTIPLE CHOICE QUESTIONS
CH. 13, SET 2

1994

27. Which of the following sets of quantum numbers (n , l , m_l , m_s) best describes the valence electron of highest energy in a ground state gallium atom (atomic number 31)?
- (A) 4, 0, 0, $\frac{1}{2}$ (D) 4, 1, 2, $\frac{1}{2}$
 (B) 4, 0, 1, $\frac{1}{2}$ (E) 4, 2, 0, $\frac{1}{2}$
 (C) 4, 1, 1, $\frac{1}{2}$

55. What volume of 0.150 M HCl is required to neutralize 25.0 mL of 0.120 M Ba(OH)₂?
- (A) 20.0 mL (D) 60.0 mL
 (B) 30.0 mL (E) 80.0 mL
 (C) 40.0 mL

1989

71. A solution of toluene (molecular weight 92.1) in benzene (molecular weight 78.1) is prepared. The mole fraction of toluene in the solution is 0.100. What is the molality of the solution?
- (A) 0.100 m (D) 1.28 m
 (B) 0.703 m (E) 1.42 m
 (C) 0.921 m

72. How many moles of solid Ba(NO₃)₂ should be added to 300. mL of 0.20 M Fe(NO₃)₃ to increase the concentration of the NO₃⁻ ion to 1.0 M? (Assume that the volume of the solution remains constant)
- (A) 0.060 mole (D) 0.30 mole
 (B) 0.12 mole (E) 0.40 mole
 (C) 0.24 mole

1984

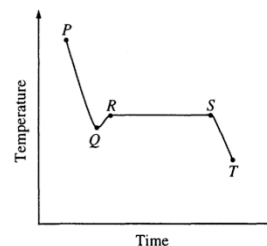
37. The molality of the glucose in a 1.0 molar glucose solution can be obtained by using which of the following?
- (A) volume of the solution
 (B) temperature of the solution
 (C) solubility of glucose in water
 (D) degree of dissociation of glucose
 (E) density of the solution

55. At 20°C the vapor pressure of toluene is 22 mm of mercury and that of benzene is 75 mm of mercury. An ideal solution, equimolar in toluene and benzene, is prepared. At 20°C, what is the mole fraction of benzene in the vapor in equilibrium with this solution?
- (A) 0.23 (C) 0.50 (E) 0.83
 (B) 0.29 (D) 0.77

69. What is the mole fraction of ethanol, C₂H₅OH, in an aqueous solution in which the ethanol concentration is 4.6 molal?
- (A) 0.0046 (D) 0.20
 (B) 0.076 (E) 0.72
 (C) 0.083

84. Which of the following solutions has the highest boiling point?
- (A) 0.10 M potassium sulfate, K₂SO₄
 (B) 0.10 M hydrochloric acid, HCl
 (C) 0.10 M ammonium nitrate, NH₄NO₃
 (D) 0.10 M magnesium sulfate, MgSO₄
 (E) 0.20 M sucrose, C₁₂H₂₂O₁₁

1999



25. The cooling curve for a pure substance as it changes from a liquid to a solid is shown above. The solid and the liquid coexist at
- (A) point Q only
 (B) point R only
 (C) all points on curve between Q & S
 (D) all points on curve between R & T
 (E) no point on the curve

31. If the temperature of an aqueous solution of NaCl is increased from 20°C to 90°C, which of the following statements is true?
- (A) The density of the solution remains unchanged.
 (B) The molarity of the solution remains unchanged.
 (C) The molality of the solution remains unchanged.
 (D) The mole fraction of solute decreases
 (E) The mole fraction of solute increases