Answer on Question #55378 – Chemistry – General chemistry

Question:

1) What are the respective concentrations (M) of Fe^{3+} and I- afforded by dissolving 0.300 mol FeI_3 in water and diluting it to 750 mL?

2) Which solution contains the largest number of moles of chloride ions?

A) 10.0 mL of 0.400 M $BaCl_2$

B) 2.00 mL of 1.000 M NaCl C) 7.50 mL of 0.200 M $FeCl_3$

D) 15.00 mL of 0.400 M KCl E) 20.00 mL of 0.100 M $CaCl_2$

3) A 51.0 mL aliquot of HCl(aq) of unknown concentration was titrated with 0.226 M NaOH(aq). It took 102.4 mL of the base to reach the endpoint of the titration. The concentration (M) of the acid was...?

1) $FeI_3 = Fe^{3+} + 3I^-$

$$c = \frac{n}{V}$$

Concentration or molarity is most expressed by lowercase *c*, 1 molar = 1 M = 1 mol/L. *n* is the amount of the solute in moles in the volume *V* (in litres)

V = 750 mL = 0.75 L

$n\ (Fe^{3+}) = n\ (FeI_3) = 0.300$ mol

$c\ (Fe^{3+}) = n\ (Fe^{3+})\ /\ V = 0.300/0.75 = 0.4$ mol/L

$n\ (I^-) = 3 \times n\ (FeI_3) = 3 \times 0.300$ mol $= 0.900$ mol

$c\ (I^-) = n\ (I^-)\ /\ V = 0.900/0.75 = 1.2$ mol/L

The Answer is c (Fe^{3+}) = 0.4 M, c (I^-) = 1.2 M

2)

A	$BaCl_2 = Ba^{2+} + 2Cl^-$	$n\ (Cl^-) = 2 \times 0.4 \times 0.01 = 0.008$ mol
B	$NaCl = Na^+ + Cl^-$	$n\ (Cl^-) = 1 \times 0.002 = 0.002$ mol
C	$FeCl_3 = Fe^{3+} + 3Cl^-$	$n\ (Cl^-) = 3 \times 0.2 \times 0.0075 = 0.0045$ mol
D	$KCl = K^+ + Cl^-$	$n\ (Cl^-) = 0.4 \times 0.015 = 0.006$ mol
E	$CaCl_2 = Ca^{2+} + 2Cl^-$	$n\ (Cl^-) = 2 \times 0.1 \times 0.02 = 0.004$ mol
The Answer is A, n=0.008 mol		

3) NaOH + HCl = NaCl + H2O

$n\ (HCl) = n\ (NaOH) = c\ (NaOH) \times V\ (NaOH) = 0.226 \times 0.1024 = 0.023$ mol

$c\ (HCl) = n\ (HCl)\ /\ V\ (HCl) = 0.023/0.051 = 0.453$ mol/L

The Answer is 0.453 M