XII - CHEMISTRY - MAIN - SOLUTIONS

31. **b)** 0.01 M
No. of moles of urea present in 100 mL of
Solution = $\frac{6.02\times10^{20}}{6.02\times10^{23}}$ = 10^{-3} mole
∴ Molar concentration of urea in the solution
= $\frac{10^{-3}}{100}$ × 1000 = 10^{-2}M= 0.01 M

32. **c)** 9.4 cc
Molarity of 95% H_2SO_4
= $\frac{95}{98}\times\frac{1}{100/1.85}$ × 1000 = 17.93M
Molarity of 15%
H_2SO_4 = $\frac{15}{98}\times\frac{1}{100/1.10}$ × 1000
= 1.68 M
M_1V_1 = M_2V_2
(95% H_2SO_4) (15% H_2SO_4)
17.93 × V_1 = 1.68 × 100 or V_1 = 9.4 cm^3

33. **b)** 0.05 M
Suppose 1 L of 0.1 M $AgNO_3$ is mixed with 1L of 0.2 M NaCl solution. Then, 0.1 mol of $AgNO_3$ will react with 0.1 mol of NaCl to form 0.1 mol of $NaNO_3$ in the solution which will ionize to produce 0.1 mol NO_3^- ions. But now volume after mixing = 2L. Hence, concentration of NO_3^- ions in the mixed solution = 0.1/2 = 0.05 M.

34. **a)** 2.5 × 10^{-3}
By Henry's law
m = K_HP
At constant temperature, K_H is constant.
∴ At two different pressures,
$\frac{m}{m'}=\frac{p}{p'}\therefore\frac{4\times10^{-3}kgL^{-1}}{m'}=\frac{100}{250}$
or m′ = $\frac{250}{100}$ × 4 × 10^{-3} kg L^{-1}
= 10^{-2} kg L^{-1} = $\frac{10^{-2}}{4}$ kg in 250 mL
= 2.5 × 10^{-3} kg

35. **b)** 0.69
$P_{N_2}=K_H\times X_{N_2}$
or X_{N_2} = $\frac{P_{N_2}}{K_H}=\frac{0.96bar}{76800bar}$ = 1.25 × 10^{-5}
If n moles of N_2 are present in 1 L of water (55.5 moles)
$X_{N_2}=\frac{n}{n+55.5}=\frac{n}{55.5}$
or n = X_{N_2} × 55.5 = 1.25 × 10^{-5} × 55.5 moles
= 69.3 × 10^{-5} moles = 0.693 millimoles

36. a) 50
n_B = $\frac{78}{78}$ = 1 mole, n_T = $\frac{46}{92}$ = 0.5 mole
x_B = $\frac{1}{1.5}$
∴ p_B = x_B × p_B = $\frac{1}{1.5}$ × 75 = 50 torr.

37. **d)** 0.2
In solution if x_A = x, x_B = 2x
and if p_A^0 = p,p_B^0 = 2 p
∴ p_A = x × p, p_B = 2x × 2p = 4x × p
∴ P_{total} = 5 xp.
Mole fraction in vapour phase
(y_A) = $\frac{p_A}{P_{Total}}=\frac{x\,p}{5x\,p}=\frac{1}{5}=0.2$

38. **a)** 0.70
Relative lowering of vapour pressure
= mole fraction of the solute in the solution,
i.e., $\frac{n_2}{n_1+n_2}$ = 0.0125 (Given)
Molality = n_2
when n_1 = 1000/18 mole = 55.55 mole
$\frac{n_1+n_2}{n_2}=\frac{1}{0.0125}$ = 80 or $\frac{n_1}{n_2}$ + 1 = 80
or $\frac{n_1}{n_2}$ = 79
or n_2 = $\frac{n_1}{79}$ = $\frac{55.55}{79}$ = 0.70

39. **d)** 550 mm, 250 mm
Molar ratio of 1 : 1 means x_X = x_Y = 0.5
P_{total} = $x_Xp_X^0$ + $x_Yp_Y^0$
400 = 0.5 p_X^0 + 0.5p_Y^0
or p_X^0 + p_Y^0 = 800 … (i)
Molar.ratio of 1 : 2 means, x_X = $\frac{1}{3}$, x_Y = $\frac{2}{3}$
∴ 350 = $\frac{1}{3}$ p_X^0 + $\frac{1}{3}$ p_Y^0
or p_X^0 + 2p_Y^0 = 1050 … (ii)
Equation (ii) – Equation (i) gives
p_Y^0 = 250mm
Putting in (i), we get p_X^0 = 550 mm

40. **c)** Plot of $1/x_A$ versus $1/y_A$ is linear
41 **b)** 87 %
42. **b)** Negative deviations from Raoult's law
43. **a)** A and B

44. **c)** $CH_3Cl_3 + C_6H_6$
45. **c)** 60.23
46. **c)** 300 torr, 1300 torr
47. **c)** 68.4
48. **c)** 100.26°C
49. **d)** Neoprene, PVC, polythene

    Neoprene, PVC, polythene are all addition homopolymers.
50. **c)** Nylon 6
51. **c)** PHBV

    Polyβ–hydroxybutyrate-co-

    β hydroxyvalerate (PHBV) is a

    biodegradable polymer involving ester

    linkages.
52. **b)** PVC and PTFE
53. **a)** Nylon 6, 6

    Nylon 66 is formed by polymerization between adipic acid [$HOOC(CH_2)_4COOH$] and hexaethylene diamine [$H_2N(CH_2)_6NH_2$] which form amide linkage.
54. **a)** Terylene
55. **a)** $(NH_4)_2CO_3$
56. **c)** $(NH_4)_3PO_4.12MoO_3$
57. **d)** $Na_2Cr_2O_7$

    $K_2Cr_2O_7 + 2H_2SO_4 \rightarrow 2KHSO_4 + 2CrO_3 + H_2O$

    $NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$

    $CrO_3 + 2HCl \rightarrow \underset{\text{orange red vapors}}{CrO_2Cl_2} + H_2O$

    $NaOH + CrO_2Cl_2 \rightarrow \underset{\text{yellow solution}}{Na_2CrO_4} + NaCl + H_2O$

    $Pb(CH_3COO)_2 + Na_2CrO_4$

    $\rightarrow \underset{\text{Yellow ppt.}}{PbCrO_4} \downarrow + CH_3COONa$
58. **d)** All of these
59. **d)** Ba^{2+}, Sr^{2+}, Ca^{2+}
60. **a)** NiS

    NiS is precipitated in alkaline medium.