Parcial #1 Lab. Química

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$80g\left(\frac{1kg}{1000g}\right) = 0.08kg$

1) $M_{alcohol} = ?$ → C_2H_5OH ← soluto

$m_{agua} = 80g$ ← solvente → 0.08kg

$m = 3.5m$

$3.5m = \frac{mol_{soluto}}{kg_{solvente}} \rightarrow 3.5m(0.08kg) = mol_{soluto}$

$0.28\,mol = mol_{soluto}$

Masa molar C_2H_5OH

C = 2 x 12 = 24
H = 6 x 1 = 6
O = 1 x 16 = 16
46 uma

$0.28mol\left(\frac{46g}{1mol}\right) = 12.88\,g\ Alcohol$

2) CH_4

C = 1 x 12 = 12
H = 4 x 1 = 4
16 uma

$15g\left(\frac{1mol\,CH_4}{16g}\right)\left(\frac{4mol\,H}{1mol\,CH_4}\right)\left(\frac{6.022\times10^{23}\text{ átomos de H}}{1mol\,H}\right) = 2.26\times10^{24}\text{ átomos H}$

PH_3

P = 1 x 30.97 = 30.97
H = 3 x 1 = 3
33.97 uma

$15g\left(\frac{1mol\,PH_3}{33.97g}\right)\left(\frac{3mol\,H}{1mol\,PH_3}\right)\left(\frac{6.022\times10^{23}\text{ átomos de H}}{1mol\,H}\right) = 7.98\times10^{23}\text{ átomos H.}$

C_2H_6O

C = 2 x 12 = 24
H = 6 x 1 = 6
O = 1 x 16 = 16
46 uma

$15g\left(\frac{1mol\,C_2H_6O}{46g}\right)\left(\frac{6mol\,H}{1mol\,C_2H_6O}\right)\left(\frac{6.022\times10^{23}\text{ átomos de H}}{1mol\,H}\right) = 1.18\times10^{24}\text{ átomos H}$

H_2

H = 2 x 1 = 2 uma

$15g\left(\frac{1mol\,H_2}{2g}\right)\left(\frac{2mol\,H}{1mol\,H_2}\right)\left(\frac{6.022\times10^{23}\text{ átomos de H}}{1mol\,H}\right) = 9.033\times10^{24}\text{ átomos de H.}$ ← mayor

HCl

H = 1 x 1 = 1
Cl = 1 x 35.45 = 35.45
36.45 uma

$15g\left(\frac{1mol\,HCl}{36.45g}\right)\left(\frac{1mol\,H}{1mol\,HCl}\right)\left(\frac{6.022\times10^{23}\text{ átomos H}}{1mol\,H}\right) = 2.48\times10^{23}\text{ átomos H.}$

5) 0.5 M H_2O

$0.5M = \frac{mol}{1L\ solución} \cdot 0.5\ mol\ H_2O \left(\frac{18\ g\ H_2O}{1\ mol}\right) = 9\ g\ H_2O$

$H = 2 \times 1 = 2$

$O = 1 \times 16 = 16$

18 uma

6) HNO_3

$H = 1 \times 1 = 1$

$N = 1 \times 14 = 14$

$O = 3 \times 16 = 48$

63 uma

$1.2M = \frac{mol\ soluto}{0.5L}$

$mol\ soluto = 1.2M \cdot 0.5L$

$= 0.6\ mol$

$0.6\ mol \left(\frac{63\ g\ HNO_3}{1\ mol}\right)\left(\frac{65\ \%}{100\ \%}\right)\left(\frac{1\ ml\ HNO_3}{1.4\ g}\right) = 17.55\ ml\ HNO_3$

7) C_7H_{16}

$C = 7 \times 12 = 84$

$H = 16 \times 1 = 16$

100 uma

$128\ g \left(\frac{1\ mol\ C_7H_{16}}{100\ g}\right) = 1.28\ mol\ C_7H_{16}$

$X = \frac{1.28\ mol}{6.84\ mol} = 0.187$

C_8H_{18}

$C = 8 \times 12 = 96$

$H = 18 \times 1 = 18$

114 uma

$332.88\ g \left(\frac{1\ mol\ C_8H_{18}}{114\ g}\right) = 2.92\ mol\ C_8H_{18}$

$X = \frac{2.92\ mol}{6.84\ mol} = 0.427$

C_9H_{20}

$C = 9 \times 12 = 108$

$H = 20 \times 1 = 20$

128 uma

$337.92\ g \left(\frac{1\ mol}{128\ g}\right) = 2.64\ mol\ C_9H_{20}$

$X = \frac{2.64\ mol}{6.84\ mol} = 0.386$

$X_{total} = 0.187 + 0.427 + 0.386$

$= 1$

$mol\ total = (1.28 + 2.92 + 2.64)\ mol$

$= 6.84\ mol$

16) 200 g solvente

$$10\% = \frac{g_{soluto}}{g_{soluto} + g_{solvente}} \times 100\%$$

$$0.10 = \frac{g_{soluto}}{g_{soluto} + g_{solvente}}$$

$$0.10(g_{soluto} + g_{solvente}) = g_{soluto}$$

$$0.10 g_{soluto} + 20 = g_{soluto}$$

$$20 = 0.9\ g_{soluto}$$

$$g_{soluto} = \frac{20\ g}{0.9\ g}$$

$$g_{soluto} = 22.22\ g$$

18) 4% de un elemento dentro de $C_{27}H_{46}O$

$C = 27 \times 12 = 324$

$H = 46 \times 1 = 46$

$O = 1 \times 16 = 16$

386 uma

$$\frac{324\ g}{386\ g} \times 100\% = 83.93\%$$

$$\frac{46\ g}{386\ g} \times 100\% = 11.92\%$$

$$\frac{16\ g}{386\ g} \times 100\% = 4.14\%$$ ← El que compone un 4% de la composición

19) N = 14 uma

$$4.20 \times 10^{23}\ \text{moléculas de } (NH_4)_2SO_4 \left(\frac{1\ mol\ (NH_4)_2SO_4}{6.022 \times 10^{23}\ \text{moléculas}}\right)\left(\frac{2\ mol\ N}{1\ mol\ (NH_4)_2SO_4}\right)\left(\frac{14\ g\ N}{1\ mol\ N}\right) = 19.53\ g\ N$$

24) 50 ml sirope de glucosa ← soluto

1000 ml H_2O ← solvente

solución = (1000 + 50) ml

= 1050 ml

$$\%\ V/V = \frac{50\ ml}{1050\ ml} \times 100\%$$

$$= 4.76\%\ V/V$$

25) $Al_2(Cr_2O_7)_3$

$2x - 14 = -2$

$2x - 14 = -2$

$2x = 12$

$x = 6+$

$Al_2(Cr_2O_7^{2-})_3$

Cr^{6+}

27) $FeCl_3$

$50cl\left(\frac{1L}{100cl}\right) = 0.5L$

$Fe = 1 \times 55.85 = 55.85$

$Cl = 3 \times 35.45 = 106.35$

$162.2\ uma$

$M = \frac{\frac{40g}{162.2g}}{0.5L} = 0.49M$

29) $g_{solido} = 10g$

$V_i = 20ml$

$V_f = 27.5ml$

$\Delta V = (27.5 - 20)ml$

$= 7.5ml$

$D = \frac{10g}{7.5ml}$

$= 1.33g/ml$

34) $2+ \times -6 = 0$

$H_2MnO_3^{2-}$

$2+ x - 6 = 0$

$x - 4 = 0$

$x = 4+$