**BUFFER REVISION WORKSHEET**

1. pH = pKa + log ([base]/[acid])

pH = 5.00

pKa = -log(1.8 x 10-5)

 = 4.74

No of moles of acetic acid = 0.2 mol/L x 0.5 L

 =0.1 mol

Therefore 5.00 = 4.74 + log([C2H3OO-]/0.1 mol)

 0.26 = log([C2H3OO-]/0.1 mol)

 [C2H3OO-]/0.1 mol = 100.26

 = 1.82

C2H3OO- = 0.182 mol

Mass of NaC2H3OO in 0.182 moles = 0.182mol x 82 g

 = 14.9g

1. pH = pKa + log (base/acid)

pH = 3.55

pKa = -log(4.0 x 10-4)

 = 3.40

[NO2-] = 0.5 molL-1 [HNO2] = 0.5mol L-1

So in 1 L, moles NO2 = 0.5mol

And moles of HNO2= 0.5 mol

Therefore 3.55 = 3.40 + log([NO2-] /[HNO2])

0.15 = log([NO2-] /[HNO2])

1.41 = [NO2-] /[HNO2]

1.41 x [HNO2] = [NO2-]

 1.41 x 0.5 mol = 0.705 mol

Therefore 705 mL of NaNO2 is mixed with 295 mL of HNO2

So the answer is D.

1. A is not a good buffer because H2SO4 is a strong acid and will completely dissociate.
2. pH = pKa + log ([base]/[acid])

pKa = 4.74 (from qn 1)

Moles of NaOH = 0.25 mol

Moles of C2H3OOH = 1 mol (as molarity is 1 M in 1 L of water)

Therefore pH = 4.74 + log(0.25/1)

 = 4.75 – 0.60

 = 4.14

So answer A is correct.

1. pH = pKa + log ([base]/[acid])

pKa = -log(4.2 x 10-7)

 = 6.38

[H2CO3] = 1 M [HCO3-] = 1 M

Therefore pH = 6.38 + log(1/1)

 = 6.38 + 0

 = 6.38

1. pH= pKa + log ([base]/[acid])

pH = 7.00

pKa = 6.38 ( from previous question)

[H2CO3] = 1 M in 1 L of water

Moles of H2CO3 = 1 M x 1 L

 = 1 mol

Therefore 7.00 = 6.38 + log ([HCO3-]/1 mol)

 0.62 = log ([HCO3-]/1 mol)

 [HCO3-]/1mol = 4.17

 [HCO3-] = 4.17 mol