FACULTY OF SCIENCE

SOWETO SCIENCE CENTRE (SSC)

TEACHERS TRAINING WORKSHOP

SUBJECT: PHYSICAL SCIENCES (CHEMISTRY)

TOPIC: ACIDS AND BASES

CAMPUS: SWC

TEST 1

DATE:	07/07/2015
SESSION:	11:00 – 13:00
ASSESSOR:	**D NKOSI**
MARKS:	24
DURATION:	15 MINUTES

NUMBER OF PAGES: 4 PAGES

SURNAME AND NAME:

_____

Please replace with COVER PAGE

SECTION A

ANSWER THIS SECTION ON THE MULTIPLE CHOICE ANSWER SHEET

1. The formula for chloric acid is…

   A. $HClO_4$
   B. $HClO_3$
   C. $HClO_2$
   D. HCl
   E. HClO

2. What is the pH of a 0.00125 *M* $Ca(OH)_2$?

   A. 2.90
   B. 11.4
   C. 2.60
   D. 11.1
   E. 12.5

3. Which one ONE of the following is a CORRECT description for a 0,1 $mol \cdot dm^{-3}$ hydrochloric acid solution?

   A. Dilute weak acid.
   B. Dilute strong acid.
   C. Concentrated weak acid.
   D. Concentrated strong acid.

4. Consider the reaction represented by the equation below.

   $H_3PO_4(aq) + HCO_3^-(aq) \rightleftharpoons H_2PO_4^-(aq) + H_2CO_3(aq)$ $K_a > 1$

   The strongest base in the above reaction is:

   A. $H_2PO_4^-$
   B. H_3PO_4
   C. HCO_3^-
   D. H_2CO_3

5. According to the Arrhenius theory an acid is a substance:

   A. that increases the concentration of hydrogen ions when dissolved in water
   B. that can donate hydrogen ions to another substance
   C. that accepts an electron-pair from another substance
   D. that increases the concentration of hydroxide ions when dissolved in water
   E. that can donate hydroxide ions to another substance

[5 x 2 = 10]

SECTION B

ANSWER THIS SECTION IN THE ANSWER BOOK 1.
GIVE ALL NUMERICAL ANSWERS TO THE CORRECT NUMBER OF SIGNIFICANT FIGURES AND WITH APPROPRIATE UNITS.

QUESTION 1

1.1 It is found that 40 mℓ of a 0,5 mol·dm-3 sodium hydroxide solution is needed to neutralise 20 mℓ of the vinegar.

Calculate the:

1.1.1 pH of the sodium hydroxide solution. (4)

1.1.2 Percentage of ethanoic acid by mass present in the vinegar
(Assume that 1 mℓ of vinegar has a mass of 1 g.) (7)

1.1.3 The sodium ethanoate (CH_3COONa) formed during the above neutralisation reaction undergoes hydrolysis to form an alkaline solution. Write down an equation for this hydrolysis reaction. (3)

[14]

DATA

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Equilibrium constants (Temperature = 25.0°C)

$K_w = 1 \times 10^{-14}$

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Atomic Number

2
He
4.0026

Atomic Weight

1 **H** *1.0079*																	2 **He** *4.0026*
3 **Li** *6.941*	4 **Be** *9.0122*											5 **B** *10.811*	6 **C** *12.011*	7 **N** *14.007*	8 **O** *15.999*	9 **F** *18.998*	10 **Ne** *20.179*
11 **Na** *22.990*	12 **Mg** *24.305*											13 **Al** *26.982*	14 **Si** *28.086*	15 **P** *30.974*	16 **S** *32.064*	17 **Cl** *35.453*	18 **Ar** *39.948*
19 **K** *39.098*	20 **Ca** *40.078*	21 **Sc** *44.956*	22 **Ti** *47.88*	23 **V** *50.942*	24 **Cr** *51.996*	25 **Mn** *54.938*	26 **Fe** *55.847*	27 **Co** *58.933*	28 **Ni** *58.69*	29 **Cu** *63.546*	30 **Zn** *65.39*	31 **Ga** *69.723*	32 **Ge** *72.61*	33 **As** *74.922*	34 **Se** *78.96*	35 **Br** *79.904*	36 **Kr** *83.80*
37 **Rb** *85.47*	38 **Sr** *87.62*	39 **Y** *88.906*	40 **Zr** *91.224*	41 **Nb** *92.906*	42 **Mo** *95.94*	43 **Tc** *(98)*	44 **Ru** *101.07*	45 **Rh** *102.91*	46 **Pd** *106.42*	47 **Ag** *107.87*	48 **Cd** *112.41*	49 **In** *114.82*	50 **Sn** *118.71*	51 **Sb** *121.75*	52 **Te** *127.60*	53 **I** *126.90*	54 **Xe** *131.29*
55 **Cs** *132.91*	56 **Ba** *137.33*	57 **La** *138.91*	72 **Hf** *178.49*	73 **Ta** *180.95*	74 **W** *183.85*	75 **Re** *186.2*	76 **Os** *190.2*	77 **Ir** *192.22*	78 **Pt** *195.08*	79 **Au** *196.97*	80 **Hg** *200.59*	81 **Tl** *204.38*	82 **Pb** *207.2*	83 **Bi** *208.98*	84 **Po** *(209)*	85 **At** *(210)*	86 **Rn** *(222)*
87 **Fr** *(223)*	88 **Ra** *226.03*	89 **Ac** *227.03*															

58 **Ce** *140.12*	59 **Pr** *140.91*	60 **Nd** *144.24*	61 **Pm** *146.92*	62 **Sm** *150.36*	63 **Eu** *151.97*	64 **Gd** *157.25*	65 **Tb** *158.93*	66 **Dy** *162.50*	67 **Ho** *164.93*	68 **Er** *167.26*	69 **Tm** *168.93*	70 **Yb** *173.04*	71 **Lu** *174.97*
90 **Th** *232.04*	91 **Pa** *231.04*	92 **U** *238.03*	93 **Np** *237.05*	94 **Pu** *(244)*	95 **Am** *(234)*	96 **Cm** *(247)*	97 **Bk** *247*	98 **Cf** *(251)*	99 **Es** *(252)*	100 **Fm** *(257)*	101 **Md** *(258)*	102 **No** *(259)*	103 **Lr** *(260)*