

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN ANIMAL HEALTH AND PRODUCTION

CHEM 00102: BASIC CHEMISTRY

STREAMS:

TIME: 2 HOURS

DAY/DATE: TUESDAY 10/04/2018

2.30 P.M – 4.30 P.M

INSTRUCTION:

- Answer question one and any other two questions

- State three sub atomic particles that makes up an atom stating their charges. [3marks]
 - Determine the number of protons, electrons and neutrons in each of the following elements: [3marks]
 - ${}^4_2\text{He}$ [3marks]
 - ${}^{24}_{12}\text{Mg}^{2+}$
 - Define the following terms: [3marks]
 - Ionization energy
 - Electronegativity
 - Nucleon
 - Differentiate between a Lewis acid and brownsted-lowry acid . [2marks]
 - Giving your rationale, identify the conjugate base, conjugate acid, base and acid in the following reaction.

$$\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4^+ + \text{OH}^-$$
 [4marks]
 - Differentiate between hydrophilic and hydrophobic substance. [2marks]

- (g) What is the pH of a urine sample whose $[H^+] = 3.0 \times 10^{-8}$ [3marks]
- (h) Draw the structures of the following compounds. [3marks]
- (i) 2,3,4 –trimethylhexane
- (ii) 4- methylpent -2-ene
- (iii) 5-ethyl-3,3,5-trimethylhept –I-yne
- (i) State 4 properties of colloids
- (j) ‘An atom is electrically neutral ‘ Explain [3marks]
2. (a) Make brief notes on the following types of bonds giving examples;
- (i) Covalent bonds [3marks]
- (ii) Hydrogen bonds [3marks]
- (b) Discuss the uses of isotopes in agriculture. [10marks]
- (b) What are the $[H_3O^+]$ and $[OH^-]$ of aspirin, which is acetylsalicylic acid that has a pH of 2.77? [4marks]
3. (a) State and explain 4 factors affecting reaction rate . [8marks]
- (b) Discuss the following classifications of solutions that arise depending on the size of solute particles. [6marks]
- (i) True solution
- (ii) Suspension
- (iii) Colloids
- (c) Define the term isomerism and give three isomers of pentane (C_5H_{12}) [4marks]
- (d) Briefly explain how you can test for unsaturation of a compound. [2marks]

4. (a) Name the following compounds: [4marks]

(b) Draw the structures of the following compounds:

(i) 2,2- dimethylbutane [4marks]

(ii) 3-Ethyl-5-methylheptane

(iii) 3-Ethyl-4-methylhex-3-ene

(iv) 5-Ethyl-2-methylhept-3-yne

(c) Explain 4 chemical properties of alkenes (ethane) [8marks]

(d) Differentiate between saturated and unsaturated hydrocarbons giving examples of each. [4marks]
