

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF CERTIFICATE IN CHEMISTRY

CHEM 00102: BASIC CHEMISTRY

STREAMS:

TIME: 2 HOURS

DAY/DATE: FRIDAY 8/12/2017

11.30 A.M - 1.30 P.M.

INSTRUCTIONS:

- Answer all the Questions in Section A and any other TWO in Section B

QUESTION ONE: [30 MARKS]

- (a) Define the following terms [3 Marks]
- Electronegativity
 - Atomic number
 - Hydrocarbon
- (b) Determine the number of protons, electrons and neutrons in each of the following elements [3 Marks]
- ${}_{11}^{23}\text{Na}$
 - ${}_{16}^{32}\text{S}^{2-}$
- (c) State the three subatomic particles that make up an atom stating their charges. [3 Marks]
- (d) Calculate the $[\text{H}_3\text{O}^+]$ for the urine sample which has a PH of 7.5. [3 Marks]
- (e) Differentiate between initial and instantaneous rate. [2 Marks]
- (f) Consider the reaction $4\text{NO}_{2g} + \text{O}_{2g} \rightarrow 2\text{N}_2\text{O}_{5g}$
 Suppose that, at a particular moment during the reaction, molecular oxygen is reacting at a rate of 0.024m/s. At what rate is N_2O_5 being formed? [4 Marks]
- (g) Distinguish between saturated and unsaturated hydrocarbons giving examples of each. [4 Marks]
- (h) State 3 physical properties of ethane. [3 Marks]

CHEM 00102

(i) Name the following compounds. [3 Marks]

(j) Explain the trend in boiling point and melting points of alkanes. [2 Marks]

QUESTION TWO [20 MARKS]

(a) State and explain 3 properties of water. [6 Marks]

(b) Explain 4 factors affecting the reaction rate. [8 Marks]

(c) Discuss the following classifications of solution that arise depending on the size of solution that arise depending on the size of solute particles. [6 Marks]

(i) True solution

(ii) Suspension

(iii) Colloids

QUESTION THREE [20 MARKS]

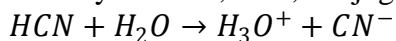
(a) Explain 3 uses of isotopes in Agriculture. [6 Marks]

(b) Briefly explain the following types of chemical bonds, giving examples of each

(i) Ionic bond

(ii) Dipole-dipole forces

(c) Identify the acid, base, conjugate acid and conjugate base for the reaction below [4 Marks]



(d) The OH^- ion concentration of a blood sample is $2.5 \times 10^{-7} \text{ M}$. What is the P^{H} of the blood? [4 Marks]

QUESTION FOUR [20 MARKS]

(a) Draw the structures of the following compounds.

[4 Marks]

- (i) 2, 3, 5 - trimethylhexane
- (ii) 4 - methylpent-2-ene
- (iii) 2, 5 - dimethylhex-2-ene
- (iv) 5 - ethyl-3, 3, 5-trimethylhept-1-yne

(b) Give the IUPAC nomenclature of the following compounds

(c) Explain the following chemical properties of ethane.

[4 Marks]

- (i) Combustion
- (ii) Halogenation

(d) State and explain the two types of isomerism in alkenes.

[4 Marks]

(e) Define the term isomerism and give three isomers of pentane (C_5H_{12})

[4 Marks]

.....