

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DIPLOMA IN ANIMAL HEALTH AND PRODUCTION

CHEM 0102: BASIC CHEMISTRY

STREAMS: DIPLOMA ANHE

TIME: 2 HOURS

DAY/DATE: MONDAY 05/07/2021

8.30 A.M. – 10.30 A.M.

INSTRUCTIONS:

- Answer question one and any other two questions in section B.

QUESTION ONE (30 MARKS)

- a) Distinguish between covalent bond and ionic bonds. (2 marks)
- b) Discuss the factors that contributes to the polar nature of water (6 marks)
- c) Derive the relationship between pOH , pH and pKW (3 marks)
- d) Discuss factors that affect rate of reaction (8 marks)
- e) Define an isotope and state the isotopes of carbon. (2 marks)
- f) Discuss three applications of emulsions (3 marks)
- g) Draw and name three constitutional isomers of pentane. (6 marks)

SECTION B

QUESTION TWO (20 MARKS)

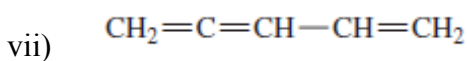
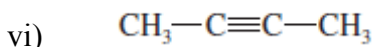
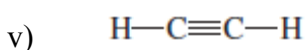
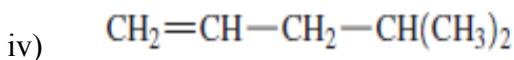
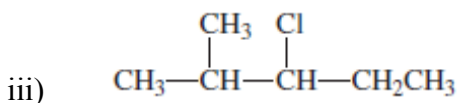
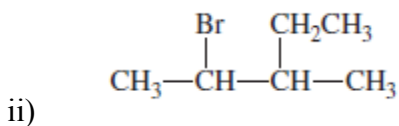
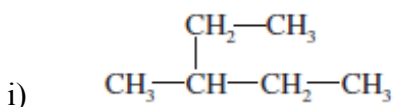
- a) Discuss the different types of Vander Waals forces (6 marks)
- b) Discuss the contributions of isotopes and radiation techniques towards strengthening national capabilities in terms of expertise and training. (9 marks)
 - (i) Plant nutrition

- (ii) Insect control
- (iii) Food preservation

c) Bromine (RAM=79.90 amu) consists of two isotopes Br-79(78.92amu) and Br-81(80.92amu). Determine the abundance of each isotope. (5 marks)

QUESTION THREE

- a) Discuss the classification of colloids based on molecular sizes. (6 marks)
- b) Name the following compounds (7 marks)



- c) An atom is electrically neutral, justify. (2 marks)
- d) Hydrogen gas has a nonpolluting combustion product (water vapor). It is used as a fuel aboard the space shuttle and in earthbound cars with prototype engines:



- I. Express the rate in terms of changes in $[H_2]$, $[O_2]$, and $[H_2O]$ with time.
- II. When $[O_2]$ is decreasing at 0.23mol/L at what rate is $[H_2O]$ increasing.

QUESTION FOUR (20 MARKS)

- a) Discuss the trends in the periodic table (6 marks)
 - (i) Atomic radius
 - (ii) Electron affinity
 - (iii) Electronegativity
 - b) In an art restoration project, a conservator prepares copper-plate etching solutions by diluting concentrated HNO_3 to 2.0M, 0.70M and 0.0043M HNO_3 . calculate $[H_3O^+]$, pH, $[OH^-]$, and pOH of the three solutions at 25°C (7 marks)
 - c) State the solvent properties of water. (3 marks)
 - d) Differentiate between homogeneous and heterogeneous catalysts (4 marks)
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