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(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE AND
BSC CHEMISTRY

COURSE CODE: SCH 230

COURSE TITLE: ORGANIC CHEMISTRY I

DATE: Wednesday 8TH August, 2018.

TIME: 2.00pm – 4:00 p.m.

INSTRUCTIONS TO CANDIDATES

Answer All Questions

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

Question one

a) Define the following terms, giving relevant examples in each

6 marks

i. Catenation

ii. Electro negativity

iii. Carbocation

iv. Nucleophilicity

b. Write the most stable lewis structure for each of the following compounds

4 marks

i. Hydrogen cyanide HCN

ii. Methylamine CH_3NH_2

iii. Ethanol $\text{CH}_3\text{CH}_2\text{OH}$

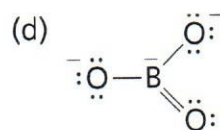
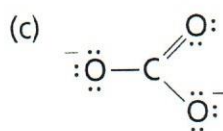
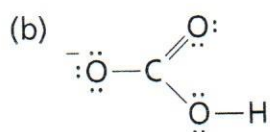
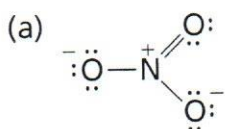
iv. Carbon dioxide CO_2

c. Calculate the formal charge on each of the atoms in the lewis structures given below. 4 marks

i. Hydronium ion, H_3O^+

ii. Nitric acid, HNO_3

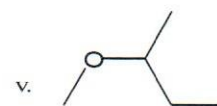
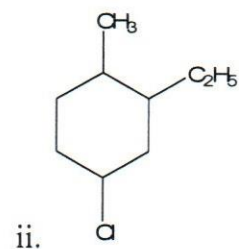
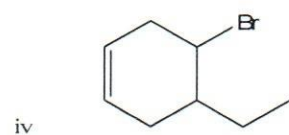
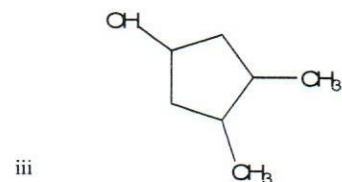
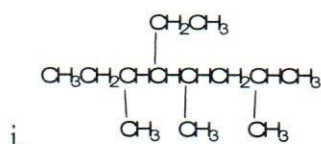
d. Electron delocalization can be important in ions as well as in neutral molecules. Using curved arrows, show how an equally stable resonance structures can be generated for each of the following anions. 4 marks



Question two

a. Phytane is a naturally occurring alkane produced by the alga spirogyra and is a constituent of petroleum. The IUPAC name for phytane is, 2,6,10,14-tetramethyl hexadecane. Write a structural formula for phytane. 2 marks

b. Give an acceptable IUPAC names for each of the following. 5 marks



c. Explain the following, giving examples where necessary

5 marks

i. Alkynes have higher boiling point than alkenes containing same number of carbon atoms.

ii. CH_3OCH_3 is soluble while $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_3$ is insoluble

d. Draw the structure of each of the following compounds

5 marks

i. 2-methyl-N-propyl-1-propanamine

ii. Ethyl acetylene

iii. 3-ethylcyclopentene

iv. 4-chloro-2-butanol

v. 2-methoxy butane

Question three

a. What product would be formed from the reaction of the following?

4 marks

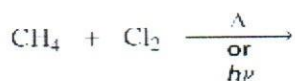
i. 3-bromo-2,2 dimethylbutane and hydroxide ion

ii. 3-iodopentane and water

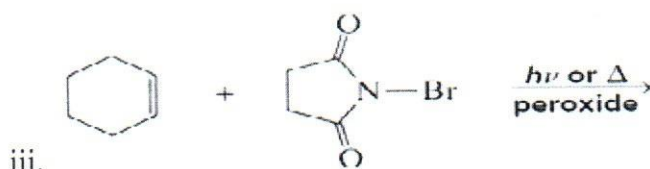
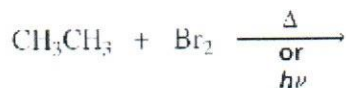
b. Write the reaction mechanism and the major end product of the following reactions

8marks

i.



ii



c. State whether the compounds above follows $\text{S}_{\text{N}}1$ or $\text{S}_{\text{N}}2$ reactions

5 marks

Question four

a. State zaitsev's rule

2 marks

b. Giving reasons, state which of the following is the most stable carbocation

2 marks

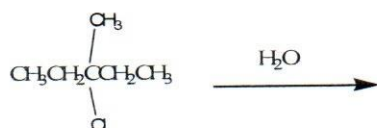
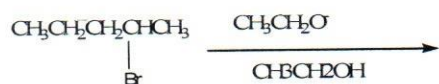
3° Benzylic, 2° allylic and vinyl

c. Explain why 1o alkyl halides do not undergo E_1 reactions

2 marks

d. Draw the major and minor end products of the following reactions

4 marks



e. Propose a mechanism for the following reaction and state whether its an E_1 or E_2 reaction

8 marks



