

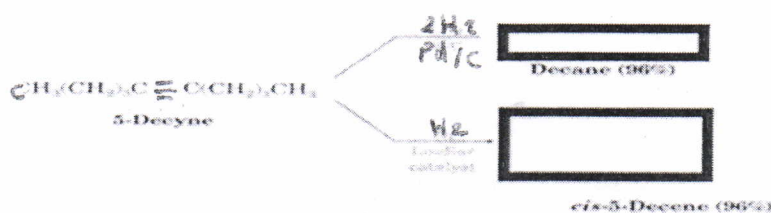
**Attempt Five questions only**

**Q1: A-** Draw a Newman projection for butane showing the conformation of the following molecule sighting down the C2—C3 bond.. [10 mark]

B: properties of de hydro halogenation alkyl halides and Mechanism Elimination (E2). [10 mark]

**Q2:A/** Complete the structural form of reaction for each of the following . [10 mark]

**1- Conversion of Alkynes to cis-Alkenes**



**2--Ozonolysis Example**



B Answer the following question by true (T) or false(F)and correct. [10 mark]

- 1- A compound with two triple bonds is a Enyne .
- 2-An Diyne has a double bond and triple bond.
- 3-A Triyne has three triple bonds.
- 4- The triple bond is shorter and stronger than single or double.
- 5- flat, 120° bond angle and σ bond & π bond properties of Alkene.

**Q3:A/** Give the structure for each of the following: [10 mark]

- (a) 2-bromo-2-methyloctane-(b) 2-chloro-3-methyl-2-pentene (c) 2,3-dimethylbutane  
(d) 2,2-Dibromo-3-hexyne .

B/ How many grams of NaOH are needed to prepare 500 ml of 0.1N sodium hydroxide solution?  
Na=23 O = 16 H= 1. [10 mark]

**Q4:A:** 1) Calculate the molarity of silver nitrate solution which is prepared by dissolving 1.26g of AgNO<sub>3</sub> in 250 ml. volumetric flasks and diluting to volume. [10 mark]  
2) How many mol. of AgNO<sub>3</sub> was 1.26 g dissolve?

107.9 Ag

B: Chemical analysis process consists of Five steps . Explain that [10 mark]

**Q5:A/** Explain the Methods of Syntheses alkenes, with examples. [8 mark]

B: Calculate the number of moles of  $K_2CO_3$  that contains 117.3 g of Potassium. .[6 mark]

C: Physical properties of Alkenes. . [6 mark]

Q6: A: The application of chemical analysis is much too long, Explain that. .[10 mark]

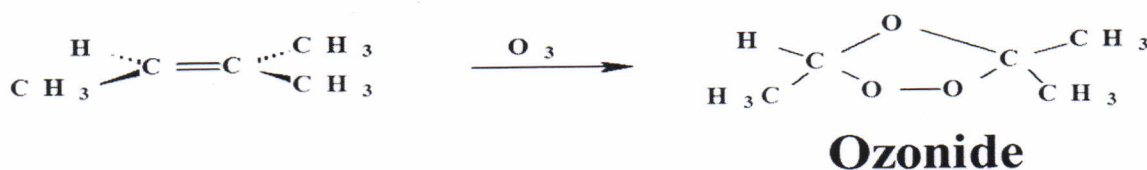
B: - Hydration of Alkynes. . [10 mark]

Caustic lime Hydration





## -2-Ozonolysis Example



■ B / Answer the following question by true (T) or false(F) and correct

■ 1-F- diyne    2- F- Enyne    3- T    4- T    5- T

■

**Q3:A/** Give the structure for each of the following –

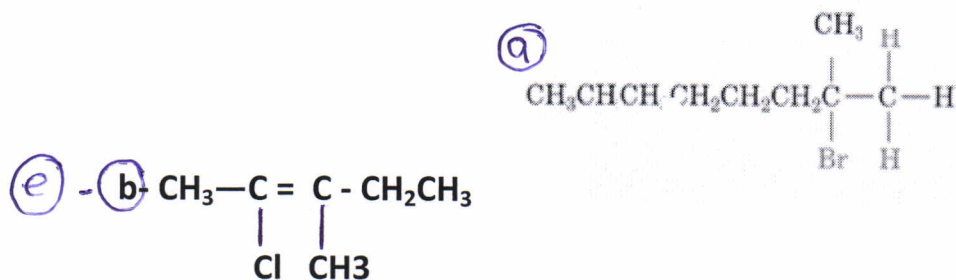
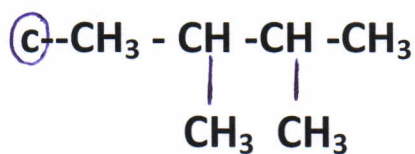
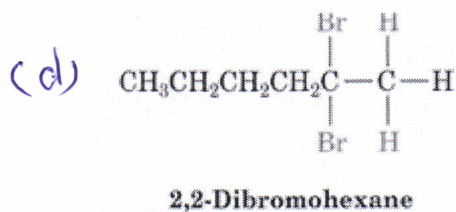
(a) 2-bromo-2-methyloctane-

(b) 2-chloro-3-methyl-2-pentene

(c) 2,3-dimethylbutane

(d) 2,2-Dibromo-3-hexyne

(e) 2-chloro-3-methyl-2-pentene







### Q3 B/

How many grams of NaOH are needed to prepare 500 ml of 0.1N sodium hydroxide solution? Na=23 O = 16 H= 1

$$\text{Mwt} = 23 + 16 + 1 = 40 \frac{\text{gm}}{\text{mol}} \quad \text{eq.wt} = \frac{40 \frac{\text{gm}}{\text{mol}}}{1 \frac{\text{eq}}{\text{mol}}} \times \frac{\text{eq}}{1000}$$

$$\text{meq. NaOH} = N \times \text{Vol. in ml} = 0.1 \frac{\text{meq}}{\text{ml}} \times 50 \text{ml} = 50 \text{ meq}$$

$$\text{mass of NaOH} = \text{meq.} \times \text{eq.wt} = 50 \text{ meq} \times 40 \frac{\text{gm}}{1000 \text{ meq}} = 2.000 \text{ gm}$$

### Q4/A

- 1) Calculate the molarity of silver nitrate solution which is prepared by dissolving 1.26g of  $\text{AgNO}_3$  in 250 ml. volumetric flasks and diluting to volume.
- 2) How many mmol. of  $\text{AgNO}_3$  was 1.26 g dissolve?

$$M = \frac{\text{moles of AgNO}_3}{\text{vol. of solu.}} = \frac{\frac{1.26 \text{g}}{169.9 \text{g/mol}}}{250 \text{ml.}} \times \frac{1000 \text{ml}}{1 \text{L}} = 0.0297 \frac{\text{mol}}{\text{L}} = 29.7 \frac{\text{mmol}}{\text{L}}$$

$$\text{mmol.} = 29.7 \frac{\text{mmol}}{\text{ml}} \times 250 \text{ ml} = 0.0297 \frac{\text{mol}}{\text{L}} = 29.7 \frac{\text{mmol}}{\text{L}} = 7.42$$

### Q4/B: The chemical analysis process consists of five steps:

#### 1) -Sampling :

In general, the sample must be homogeneous and representative of the whole substance . Its size may vary from a few grams or less to several pounds, depending on the type of bulk material. This sample is called "gross sample". The portion of this sample that can be taken for analysis is called " analysis sample". The accuracy of measurements is highly limited by the sampling process.

#### 2) - Pretreating the sample:

In some cases the analysis sample must be chemically or physically pretreated before the chemical chemical analysis such as dissolving, dilution, crushing.... etc.

#### 3) - Method Selection:

Selection of the method employed for for quantitative analysis depends on many factors. Comparison between different analytical methods with respect to sensitivity, precision,





selectivity, speed and cost are shown in table (1-1). Selection of the analytical technique, when more than one is applicable, will depend, of course, on the availability of equipment.

#### 4) - Measurements or Taking the analysis data:

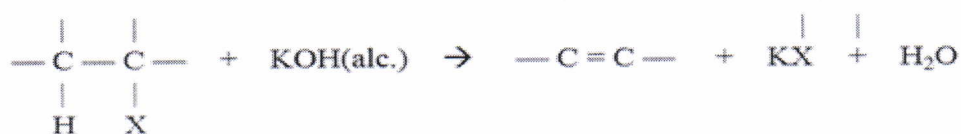
Several replicate analysis may be performed on the same sample and the standard procedures that put by professional societies such as American Society for Testing Materials (ASTM) or Association of Official Analytical Chemists (AOAC) and others can be followed.

#### 5) - Data Handling and Obtaining the Result:

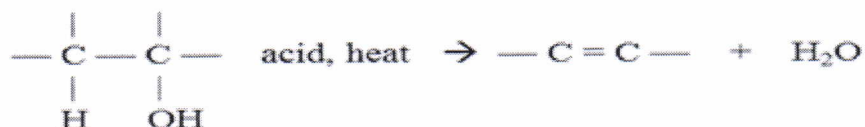
The laboratory data observed from chemical analysis or instrumental reading must be mathematically treated in order to observe a meaningful result.

### Q5 A/: Syntheses, alkenes:

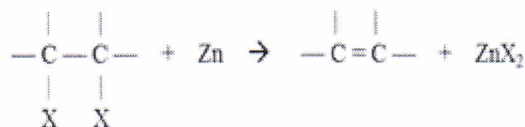
#### 1.dehydrohalogenation of alkyl halides



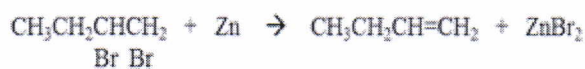
#### 2.dehydration of alcohols:



#### 3.dehalogenation of vicinal dihalides



eg.



### B: Calculate the number of moles of K<sub>2</sub>CO<sub>3</sub> that contains 117.3 g of Potassium

$$g. \text{ atom of K} = 117.3 / 39.1 = 3g. \text{ atom}$$

Each mole of K<sub>2</sub>CO<sub>3</sub> contains 2g.atom of K



NO. of moles of  $K_2CO_3 = 3/2 = 1.5 \text{ mol}$

**C:Physical properties:**

- 1 -non-polar or weakly polar
- 2- no hydrogen bonding
- 3-relatively low mp/bp ~ alkanes
- 4- water insoluble

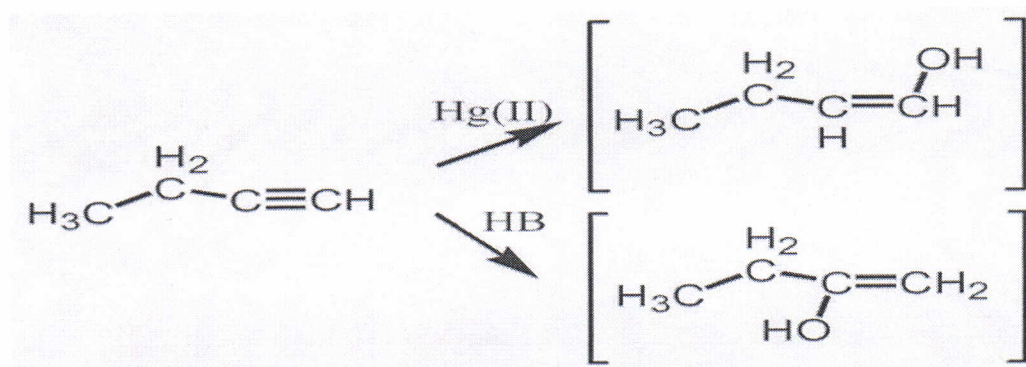
**Q6 A/Applications of Chemical Analysis:**

- 1)- Chemical analysis of air and water to determine the pollutants.
- 2) - Medicine relies heavily on chemical analysis to diagnose illness properly and to monitor the progress of patients.
- 3)- Chemical analysis of soil and plants is used to determine the type of fertilizer which must be added to the soil to increase productivity.
- 4)- The flue gas analysis (e.g. Orsat analysis) can be used to evaluate the energy produced from combustion processes of fuel.
- 5) - Chemical analysis of raw materials and final products are important steps in all chemical plants for quality control of industrial products.
- 6) - Most of applied researches in many scientific fields such as chemical, biological, engineering, ....etc cannot be performed without chemical analysis.

**Q6/B: Hydration of Alkynes:**

- Addition of H-OH as in alkenes
  - Mercury (II) catalyzes Markovnikov oriented addition
  - Hydroboration-oxidation gives the non-Markovnikov product





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