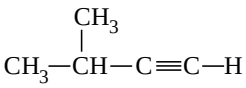
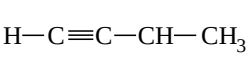
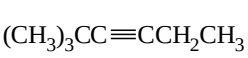
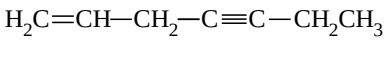
ALKYNES

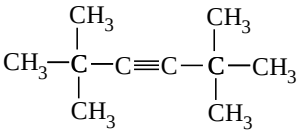
A. Name the following alkenes.

A. 

B. 

C. 

D. 

E. 

2. Draw the structural formula of the following alkenes.
A. 3-methyl- 1-pentyne
B. 2,5-dimethyl- 3-heptyne
C. 2-butyne
D. 1-hexyne
E. 4-chloro-2-pentyne
F. 3-bromo-1-hexyne

3. Write down the possible isomers of the alkynes that have the molecular formula, C_6H_{10}.

4. Complete the following reactions.
A.propyne + HCl (excess) $\rightarrow$
B. 1-pentene + Br_2 then $KOH_{(alcohol)}$ $\rightarrow$
C. propyne + silvernitrate + ammonia $\rightarrow$

5. Indicate the steps to obtain the product from the starting reagent.
A. $(CH_3)_2CHCH=CH_2 \rightarrow (CH_3)_2CH\text{-}C\equiv CH$

B. $CH_3CH_2CH_2CH_2Br \rightarrow CH_3CH_2\text{–}C \equiv CH$

C. $(CH_3)_2CHCH_2CH=CH_2 \rightarrow (CH_3)_2CH\text{-}C \equiv C\text{-}CH_3$

D. $CH_3CH_2CH_2CH_2OH \rightarrow CH_3\text{-}C\equiv C\text{-}CH_3$

6. 10% of the molecular weight of an alkyne is hydrogen. What is the molecular formula of the alkyne?
1-

7. A 2.7 g sample of an alkyne, when burned, produces 8.8 g of carbon dioxide. What is the molecular formula of the alkyne?

8. A 13.6 g sample of an alkyne requires 31.36 L of oxygen at STP to be burned completely. What is the molecular formula of the alkyne?

9. When an alkyne is burned, the mass of water produced is the same as the mass of alkyne used up. What is the molecular formula of alkyne?

10. A 2.7 g sample of alkyne can be saturated with 2.24 L of hydrogen at STP. What is the molecular formula and name of the alkyne?

11. A 10 cm^3 sample of hydrogen adds to a 20 cm^3 mixture of C_2H_6 and C_2H_2.What is the percentage by volume of ethane in the mixture?

12. When a 10 g sample of the mixture of methane and acetylene reacts with aqueous ammoniacal cuprous chloride, a 30.2 g precipitate is formed. What is the percentage by mass of methane in the mixture?

13. A 50 cm^3 mixture of acetylene and ethylene gases can be saturated with 70 cm^3 of hydrogen gas at the same conditions. What is the percentage by moles of acetylene in the mixture?

14. One-fourth of an 80cm^3 mixture of C_2H_6, C_2H_4 and C_2H_2 is ethane. If 230cm^3 of oxygen gas are needed to burn the mixture, what is the volume of each gas in the mixture?

15. A 32 g sample of methane occupies 30 L of volume. At the same conditions, a sample of propyne occupies 45 L of volume. How many liters of hydrogen can add the alkyne at the same conditions?

16. How many liters of oxygen gas at STP are needed to burn a sample of acetylene that is obtained from 6.4g of calcium carbide, CaC_2? (5.6L)

17. 0.5 mol of hydrogen gas is consumed to saturate 0.3 mol of the mixture of ethylene and acetylene. What is the mole of acetylene in the mixture?

18. What is the molecular formula of an alkyne, a 1.7 g sample of which is saturated with 200 g of 4% aqueous solution of bromine?

19. The carbondioxide produced by the combustion of 10 g propyne can be absorbed by a 3 L solution of NaOH. What is the molar concentration of NaOH solution?

20. The carbondioxide gas that is produced by the complete combustion of 5.6 L of an alkyne at STP is 30.5 g heavier than the alkyne. Find the molecular formula of the alkyne and write the names and structures of the isomers.

MULTIPLE CHOICES

1. Ethylene is the first member of
A. alkane
B. alkene
C. saturated hydrocarbons
D. alkyne
E. aromatics

2. What is the coefficient of O_2 in the combustion reaction of a hydrocarbon having the general formula C_nH_{2n-2}?
A. n-1
B. (3n-1)/2
C. 3n+1
D. 3n-1
E. (2n-1)/2

3. How many liters of O_2 at STP are required to burn C_2H_2 obtained from 32g of 80% pure CaC_2?
A. 11.2 B. 22.4 C. 33.6 D. 44.8 E. 67.2

4. Which of the following hydrocarbon produces 16.8 L CO_2 when 0.25 mol of it is burned under STP, and 1 mol of it becomes saturated with 2mol of H_2?
A. CH_3-CH=CH_2
B. CH_3-CH=$CHCH_3$
C. CH_3-C≡CH
D. CH_2=CH-CH=CH_2
E. CH_3-CH_2-CH_3

5. What is the hydrocarbon, which forms a white precipitate with ammonical $AgNO_3$ solution and decolorizes bromine solution?
A. CH_4 B. C_2H_6 C. C_2H_4 D. C_2H_2 E. C_3H_6

6. I. They are unsaturated hydrocarbons.
II. They contain carbon-carbon triple bond.
III. The general formula of alkynes is C_nH_{2n+2}.
Which one(s) is/are **correct** for alkynes?
A. I only
B. II only
C. I and II
D. I and III
E. I, II and III

7. For **alkynes**;
I. Hybrid orbital: **sp**
II. Geometry: **linear**
III. Bond angle: **120 ^{0}**
Which statement(s) is/are expected to be **correct**?
A. I only
B. I and II
C. I and III
D. II and III
E. I, II and III

8. I. C_2H_2 II. C_3H_3 III. C_4H_6
Which of the compounds given above is alkyne?
A. I only
B. I and II
C. I and III
D. II and III
E. I, II and III

9. How many sigma (σ) and pi (π) bonds are there in acetylene?
A. 2 π , 9 σ
B. 3 π , 8 σ
C. 2 π , 2 σ
D. 3 π , 9 σ
E. 2 π , 3 σ

10. $C_2H_2 + x\ O_2 \rightarrow y\ CO_2 + H_2O$
What can be x and y?
A. 2 – 1
B. 5/2 – 3/2
C. 5/2 – 2
D. 7/2 – 2
E. 4 – ½

11. $Cl{-}CH_2{-}C{\equiv}CH$
What is the name of the above alkyne?
A. 1-chloro ethyne
B. 1-chloro propyne
C. 2-chloro propyne
D. 3-chloro propyne
E. chloro ethane

12. Which of the following is the structural formula of 3-methyl-1-pentyne?
A. CH_3-C≡C-CH_3
B. $H_3C{-}CH(C_2H_5){-}C{\equiv}CH$
C. $H_3C{-}H_2C{-}CH_2{-}C{\equiv}CH$
D. $H_3C{-}C{\equiv}C{-}C{-}CH_3$
E. $H_3C{-}CH(CH_3){-}C{\equiv}C{-}CH_3$

13. What is the volume of 52 g of acetylene at STP?
A. 6.72 L
B. 11.2 L
C. 22.4 L
D. 44.8 L
E. 67.2 L

14. How many moles of oxygen are needed to burn 6.8 g of C_5H_8 at STP?
A. 0.4 B. 0.6 C. 7 D. 0.7 E. 2

15. Which of the following hydrocarbons produces a white precipitate when reacted with $AgNO_3$ in NH_3 solution?
A. C_2H_4
B. C_2H_6
C. C_3H_6
D. C_2H_2
E. CH_4

16. $CH_3{-}C{\equiv}CH + xH_2 \xrightarrow{Ni}$ Propane
What is the coefficient "x" in the given reaction?
A. 1 B. 2 C. 5/2 D. 3 E. 4

17. How many molecules of acetylene join together to form benzene when passed through a red hot tube?
A. 1 B. 2 C. 3 D. 4 E. 5

18. 10 moles of O_2 are used to burn one mole of an alkyne. What is the formula of the alkyne?
A. C_7H_{12}
B. C_7H_{14}
C. C_7H_{16}
D. C_5H_8
E. C_5H_{10}

19. How many moles of acetylene can be prepared at STP by the reaction of 128 g of calcium carbide (CaC_2) with excess water?
A. 1 B. 2 C. 3 D. 4 E. 5

20. How many liters of hydrogen at STP are required to saturate 4 g of propyne completely?
A. 44.8 B. 4.48 C. 5.6 D. 11.2 E. 22.4

21. Which compound is used in welding?
A. C_2H_2
B. C_2H_4
C. C_3H_4
D. C_3H_6
E. CH_4

22. CH_3-C≡C-CH_3 + 2HCl → X
What is the product of the reaction given above?
A. 2,3- dichloro butyne
B. 2,3- dichloro butane
C. 2,2-dichloro butyne
D. 2,2-dichloro butane
E. 2,2-dichloro butene