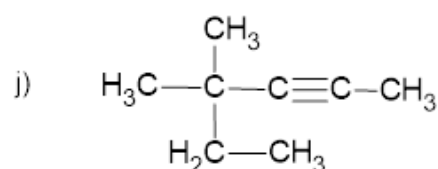
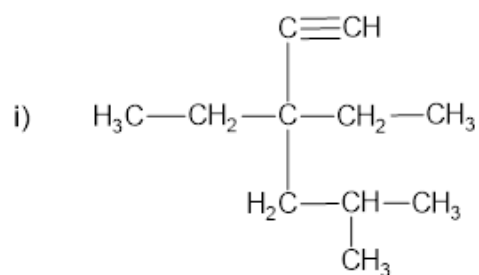
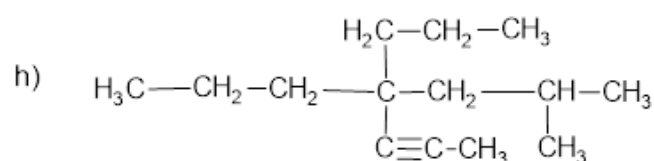
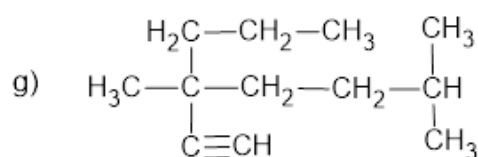
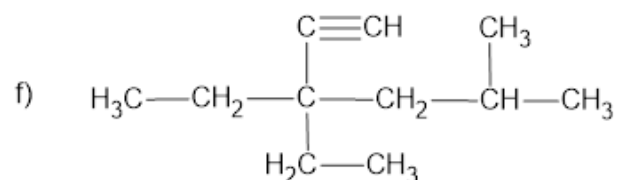
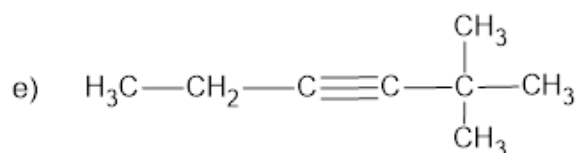
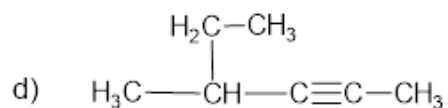
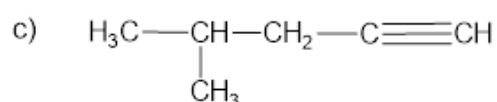
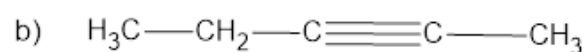
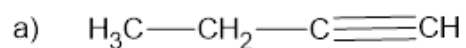


# Alkynes

(1) Give IUPAC names for compounds with the following structures.

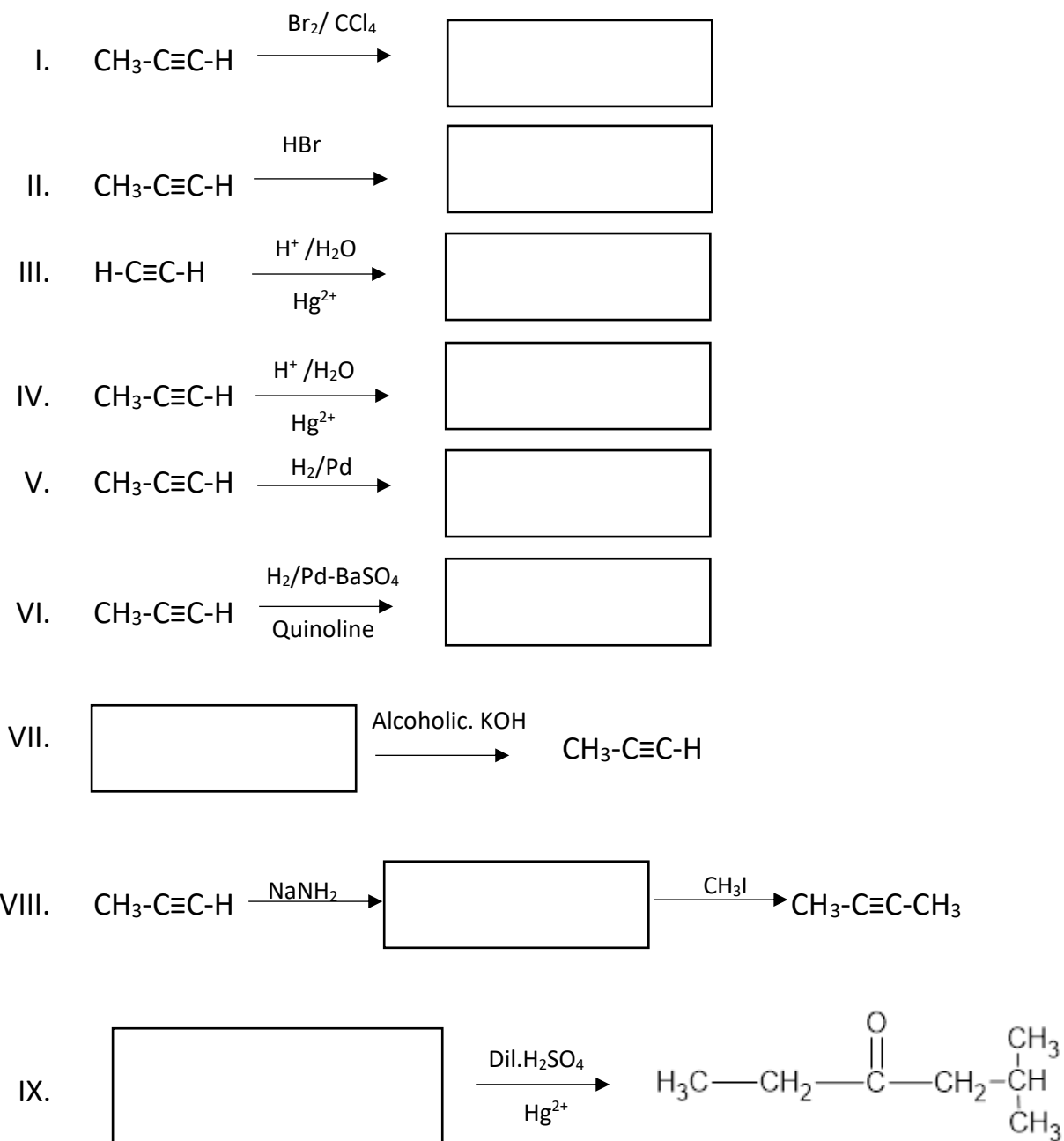


(2) Draw structures corresponding to the following IUPAC names.

- I. ethyne
- II. 3-pentyne
- III. 2-hexyne
- IV. 4-methylpent-2-yne
- V. 2-ethylhex-3-yne

- VI. 2,2-dimethylhex-3-yne
- VII. 2-ethyl-3-methyloct-4-yne
- VIII. 7-methyl-3-propyloctyne
- IX. 3,4-dimethylpentyne
- X. 2,5-dipropyl-3-hexyne

(3) Write the suitable reagent or the structure in the boxes given below.





(4) Do the following conversions.

- i.  $\text{CH}_3\text{CH}_2\text{Br} \longrightarrow \text{CH}\equiv\text{CH}$
- ii.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \longrightarrow \text{CH}_3\text{C}\equiv\text{CH}$
- iii.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br} \longrightarrow \text{CH}_3\text{C}\equiv\text{CCH}_3$
- iv.  $\text{CH}_3\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_3$
- v.  $\text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}\equiv\text{CH}_2$
- vi.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH} \longrightarrow \text{CH}_3\text{C}\equiv\text{CCH}_3$
- vii.  $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CH}_2\text{COCH}_3$
- viii.  $\text{CH}\equiv\text{CH} \longrightarrow \text{HCBBr}_2\text{CBr}_2\text{CH}_3$
- ix.  $\text{CH}_3\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CBr}_2\text{CH}_3$
- x.  $\text{HC}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CHO}$
- xi.  $\text{CH}_3\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{COCH}_3$
- xii.  $\text{CH}_3\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- xiii.  $\text{HC}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CH}_2\text{COCH}_3$
- xiv.  $\text{HC}\equiv\text{CH} \longrightarrow \text{CH}_3\text{C}\equiv\text{CCH}_3$
- xv.  $\text{CH}_3\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{C}\equiv\text{C-Ag}$
- xvi.  $\text{CH}_3\text{CHBrCH}_2\text{Br} \longrightarrow \text{CH}_3\text{COCH}_3$
- xvii.  $\text{CH}_3\text{CH}_2\text{OH} \longrightarrow \text{CH}_3\text{CHO}$
- xviii.  $\text{CH}_3\text{CH}_2\text{Br} \longrightarrow \text{CH}_3\text{CH}_2\text{COCH}_3$
- xix.  $\text{CH}_3\text{CH}_2\text{Br} \longrightarrow \text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_2\text{CH}_3$
- xx.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \longrightarrow \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

(5) Write a test to distinguish following compounds.

- i.  $\text{CH}_3\text{CH}_2\text{CH}_3$  and  $\text{CH}_3\text{C}\equiv\text{CH}$
- ii.  $\text{CH}_2=\text{CH}_2$  and  $\text{HC}\equiv\text{CH}$
- iii.  $\text{CH}_3\text{CH}=\text{CH}_2$  and  $\text{CH}_3\text{C}\equiv\text{CH}$
- iv.  $\text{HC}\equiv\text{CH}$  and  $\text{CH}_3\text{C}\equiv\text{CCH}_3$

(6) Draw the possible structures for the following compounds.

- I.  $C_4$  compound with 2SP hybridized orbitals with  $2SP^2$  hybridized orbitals.
- II.  $C_4$  compound with 2SP hybridized orbitals with  $2SP^3$  hybridized orbitals.
- III. Compound with  $1SP^3$  hybridized orbital with  $2SP^2$  hybridized orbitals and 2SP hybridized orbitals.

(7) State whether the following statements are true or false.

- i. Alkynes with one triple bond and without any other functional group follow the general formula of  $C_nH_{2n-2}$ . ( )
- ii. carbon-carbon triple bond in alkyne are stronger and longer than that of a carbon-carbon double bond. ( )
- iii. As the polarity of alkynes is also low, their physical properties are very similar to those of the corresponding alkanes and alkenes. ( )
- iv. The angle between the two atoms attached to the SP hybridized carbon will be lower than  $180^\circ$ . ( )
- v. First, one water molecule is added to an alkyne in the presence of  $Hg^{2+}$  and diluted  $H_2SO_4$  to produce an enol. ( )
- vi. The addition of water to alkynes takes place according to the Anti-Markovnikov's rule. ( )
- vii. Terminal alkynes react with certain heavy metal ions such as  $Ag^+$  and  $Cu^+$  to form insoluble metal acetylides. ( )
- viii. All alkynes can react with strong bases such as  $NaNH_2$  and active metals such as Na. ( )

(8) Which one of the following statements about ethyne is false?

- i. All the C atoms are sp hybridized.
- ii. It contains two equivalent sp hybrid orbitals which lie in the same straight line and point in opposite directions.
- iii. The two unhybridized p orbitals lie perpendicular to each other and to these two sp orbitals.
- iv. This can form a ketone with diluted sulfuric acid in the presence of  $\text{Hg}^{2+}$ .
- v. This molecule is linear in shape.

(9) Which of the following would not react with propyne?

- i.  $\text{Br}_2$  water
- ii.  $\text{Cu}_2\text{Cl}_2$  with ammonia
- iii.  $\text{AgNO}_3$  with ammonia
- iv. NaOH
- v. Basic  $\text{KMnO}_4$

(10) Characteristic reaction type of alkynes is ,

- i. Electrophilic substitution reactions
- ii. Electrophilic addition reactions
- iii. Nucleophilic substitution reactions
- iv. Nucleophilic addition reactions
- v. Free radical reactions