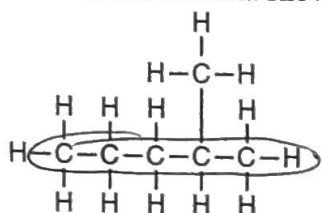


1. Which compound is saturated? *single bond alkane*  
 A) butane B) ethene  
 C) heptene D) pentyne

2. What is the chemical name for the compound  $CH_3CH_2CH_2CH_3$ ? *C<sub>4</sub>H<sub>10</sub>*  
 A) butane B) butene  
 C) decane D) decene

3. What is the IUPAC name of the organic compound that has the formula shown below?

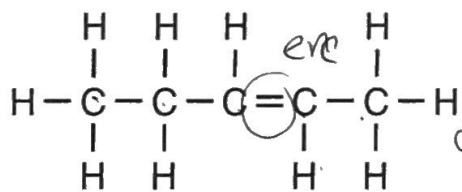


*add branch on smallest # carbon*

- A) 1,1-dimethylbutane B) 2-methylpentane  
 C) hexane D) 4-methylpentane

4. Which formula represents an unsaturated hydrocarbon? *H&C only*  
 A) B) *double or triple bond*  
 C) D)

5. Given the formula representing a compound:



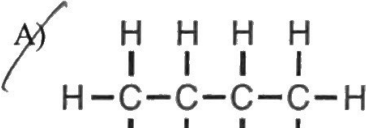
*ene*  
*bond starts on smallest carbon*  
 SC

- What is a chemical name of this compound?  
 A) 2-pentene B) 2-pentyne  
 C) 3-pentene D) 3-pentyne

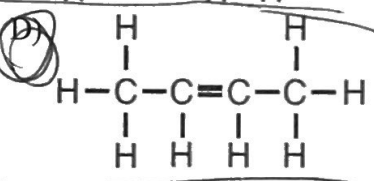
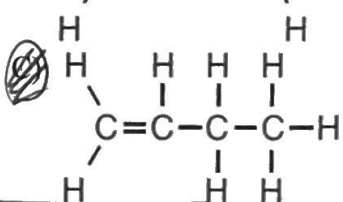
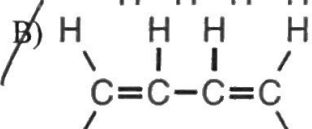
6. A molecule of an unsaturated hydrocarbon must have

- A) at least one single carbon-carbon bond  
 B) at least one multiple carbon-carbon bond  
 C) two or more single carbon-carbon bonds  
 D) two or more multiple carbon-carbon bonds

7. Which formula represents 2-butene? *4C5*



*double bond on 2nd carbon*



8. A double carbon-carbon bond is found in a molecule of *ene*

- A) pentane B) pentene  
 C) pentyne D) pentanol

9. Which formula represents an alkyne? *TABLE Q*

- A)  $C_nH_n$  B)  $C_{2n}H_n$  *ene*  
 C)  $C_nH_{2n+2}$  *ane* D)  $C_nH_{2n-2}$  *no*

10. Which general formula represents the homologous series of hydrocarbons that includes the compound 1-heptyne? *TABLE Q*

- A)  $C_nH_{2n-6}$  B)  $C_nH_{2n-2}$  *triple bond*  
 C)  $C_nH_{2n}$  D)  $C_nH_{2n+2}$

11. Given the structural formula:



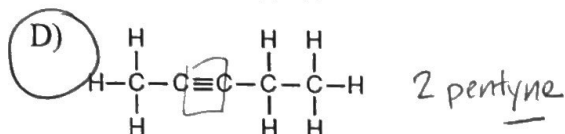
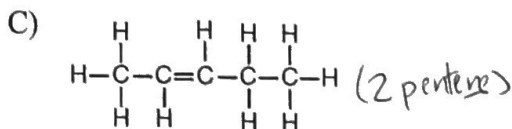
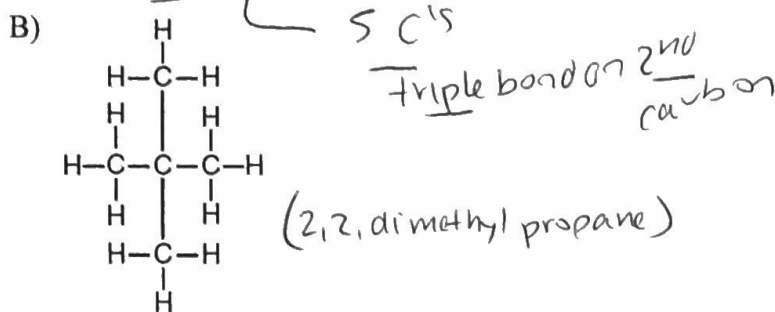
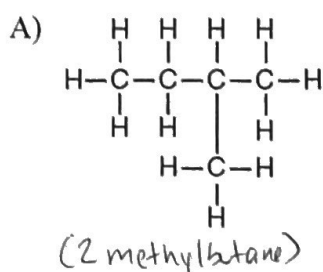
What is the total number of electrons shared in the bond between the two carbon atoms?

- A) 6 B) 2 C) 3 D) 4

$- = 1 \text{ pair} = 2e^-$   
 $= = 2 \text{ pair} = 4e^-$   
 $\equiv = 3 \text{ pair} = 6e^-$

KEY

12. Which structural formula represents 2-pentyne?



Base your answers to questions 13 and 14 on the information below and on your knowledge of chemistry.

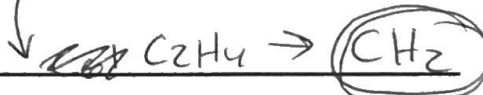
Fruit growers in Florida protect oranges when the temperature is near freezing by spraying water on them. It is the freezing of the water that protects the oranges from frost damage. When  $H_2O(l)$  at  $0^\circ C$  changes to  $H_2O(s)$  at  $0^\circ C$ , heat energy is released. This energy helps to prevent the temperature inside the orange from dropping below freezing, which could damage the fruit. After harvesting, oranges can be exposed to ethene gas,  $C_2H_4$ , to improve their color.

13. Explain, in terms of bonding, why the hydrocarbon ethene is classified as unsaturated.

double bond is present

14. Write the empirical formula for ethene.

Simplest ratio



Base your answers to questions 15 and 16 on the information below and on your knowledge of chemistry.

Natural gas and coal are two fuels burned to produce energy. Natural gas consists of approximately 80% methane, 10% ethane, 4% propane, 2% butane, and other components.

The burning of coal usually produces sulfur dioxide,  $SO_2(g)$  and sulfur trioxide,  $SO_3(g)$ , which are major air pollutants. Both  $SO_2(g)$  and  $SO_3(g)$  react with water in the air to form acids.

15. Draw a structural formula for the hydrocarbon that is approximately 2% of natural gas.

16. Write the general formula for the homologous series that includes the components of the natural gas listed in this passage.



TABLE Q

→ butane

