Biology

Topic: carbon chemistry

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1. Why is the study of carbon compounds important?
   A. Because carbon is the central element to all living organisms
   B. Because carbon is a key element in producing electricity
   C. Because without carbon the Sun would run out of energy
   D. All of the above

2. What type of organic molecule is built using long chains of amino acids?
   A. Carbohydrates
   B. Proteins
   C. Nucleic Acids
   D. Lipids

3. What type of organic molecule includes sugars and starches?
   A. Nucleic Acids
   B. Carbohydrates
   C. Lipids
   D. Proteins

4. Organic substances are always made from the same four elements including carbon, hydrogen, oxygen, and nitrogen.
   A. FALSE
   B. TRUE

5. What element is present in all organic compounds?
   A. Sulfur
   B. Carbon
   C. Oxygen
   D. Hydrogen

6. What functional group of organic compounds is made up of only hydrogen and carbon atoms?
   A. Hycarbonates
   B. Nitrates
   C. Hydrocarbons
   D. Carbohydrates

7. What type of organic molecule includes the long chain molecules DNA and RNA?
   A. Proteins
   B. Lipids
   C. Nucleic Acids
   D. Carbohydrates

8. Which formula represents butane?
   A. CH3CH3
   B. CH3CH2CH3
   C. CH3CH2CH2CH3
   D. CH3CH2CH2CH2CH3

9. A hydrocarbon molecule is considered to be saturated if the molecule contains
   A. Single covalent bonds, only
   B. A double covalent bond, only
   C. A triple covalent bond
   D. Single and double covalent bonds

10. A hydrocarbon with no ring structure, no double or triple bonds is called an __.
    A. Alkene
    B. Alkyne
    C. Alkane
    D. Alkali

11. A hydrocarbon double bonds and no triple bond configuration is called an __.
    A. Alkene
    B. Alkyne
    C. Alkane
    D. Alkali

12. Which of the following is the molecular formula for ethane?
    A. C2H2
    B. C2H4
    C. C2H6
    D. C2H8

13. Which of the following is the molecular formula for ethene?
A. C2H2
B. C2H4
C. C2H6
D. C2H8

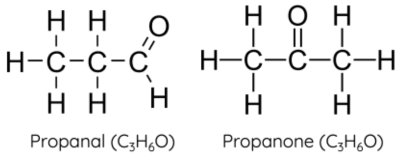
14. Which of the following is the molecular formula for butane?
    A. C2H
    B. C2H6
    C. C4H8
    D. C4H10

15. Which of the following is the molecular formula for hexane?
    A. C5H11
    B. C5H12
    C. C6H12
    D. C6H14

16. Synthesis of polymers from smaller molecules or monomers is called condensation
    A. True
    B. False

17. All of these are considered macromolecules except:
    A. Carbohydrates
    B. nucleic acids
    C. lipids
    D. Proteins

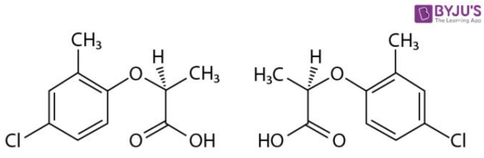
18. The two molecules in the picture are considered:
    A. Isotopes
    B. Enantiomers
    C. Structural isomers
    D. Geometric isomers



19. Hydrocarbons are hydrophilic compounds
    A. True
    B. False

20. C2H6 is the simplest organic compound.
    A. True
    B. False

21. The two molecules in the picture are considered:



A. Isotopes
B. Enantiomers
C. Structural isomers
D. Geometric isomers

22. Choose the wrong statement about hydrocarbons.
    A. They are hydrophobic compounds
    B. They consist of carbon and hydrogen
    C. They give small amount of energy.
    D. They are major components of petroleum
    E. None of the above

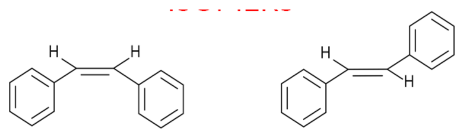
23. All are chemical groups that can be attached to hydrocarbons except:
    A. Methyl CH3
    B. Carboxyl COOH
    C. Sulfhydryl SH
    D. None of the above

24. Enzymes are:
    A. Carbohydrates
    B. Proteins
    C. nucleic acids
    D. lipids

25. hydrolysis is a chemical reaction that uses water and stores energy
    A. true
    B. false

26. Compounds that have the same numbers of atoms of the same elements but with different structure and properties are called isomers.
    A. True
    B. False

27. The two molecules in the picture are considered:



A. Isotopes
B. Enantiomers
C. Structural isomers
D. Geometric isomers

28. Cis and trans isomers are structural isomers
    A. True
    B. False

29. Due to variation in the architecture of organic molecules isotopes are found.
    A. True
    B. false

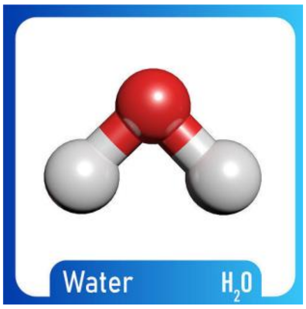
30. in cis and trans isomers:
A. different covalent partner but same spatial arrangement of atoms attached to skeleton atoms.
B. Differ in shape due to the presence of asymmetric carbon:
C. same covalent partner but different spatial arrangement of atoms attached to skeleton atoms.
D. differ in the covalent arrangement or differ in the location of double bonds

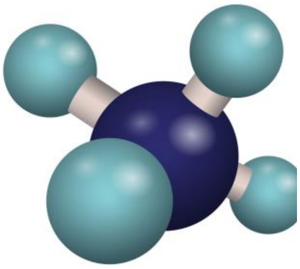
31. building new bonds leads to energy being released
   A. true
   B. false

1. A	9. A	17.C	25.B
2.B	10.C	18.C	26.A
3.B	11.A	19.B	27.D
4.A	12.C	20.B	28.B
5.B	13.B	21.B	29.B
6.C	14.D	22.C	30.C
7.C	15.D	23.D	31.B
8.C	16.A	24.B	

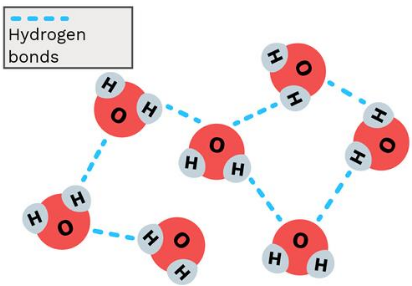
- polarity of a molecule
  if the difference in electronegativity of two elements is larger than 0.5,
  ENH= 2.1
  ENC = 2.5
  So, $\Delta EN=2.5-2.1=0.4$

  ENO= 3.5.





- hydrogen bond: not a covalent bond to a hydrogen atom.
  It results from the attractive force between
  a hydrogen atom covalently bonded to a
  very electronegative atom such as a N, O, or F
  atom and another very electronegative atom.



- Saturation of hydrocarbons

- Asymmetric carbon: a carbon within an organic compound that contains four different atoms or groups of atoms bonded to it.