Organic: properties

1. The number of electrons that is/are shared in a **single** hydrogen-carbon bond is/are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons.
2. One b) two

c) four d) six

1. Acetylene (C2H2(g)) is classified as an **unsaturated hydrocarbon**. Choose the TRUE statement about acetylene below.
2. It easily dissolves in water.
3. It is the first member of the alkenes.
4. It will undergo a substitution reaction with chlorine.
5. It is a member of the alkyne series.
6. Below is a list of organic compounds. The compound that could contain a trigonal planar shape about one of its central atoms is
7. C4H10 b) C2H2

c) CH3COOH d) C2H5OH

1. Which of the following is **NOT** a property of alkanes?
2. They are soluble in water.
3. They undergo substitution reactions with halogens.
4. The boiling point increases as the number of carbons increase.
5. They are non-reactive under ordinary conditions.
6. Propane ( C3H8(g)) has low solubility in water. This is primarily due to the fact that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Propane is a gas.
8. Propane is nonpolar and water is polar.
9. Both propane and water are nonpolar.
10. Propane is polar and water is nonpolar.
11. Use the organic compounds listed in the chart below to answer the following question(s).

|  |  |
| --- | --- |
| Number | Compound |
| 1 | Sucrose(C12H22O11) |
| 2 | Acetylene (C2H2) |
| 3 | Methanal (CH2O) |
| 4 | Benzene (C6H6) |
| 5 | Ethanol (C2H5OH) |
| 6 | Methanoic Acid (HCOOH) |
| 7 | Glucose (C6H12O6) |

The compound that is the **least stable** at room temperature is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ while the compound that is the **most stable** at room temperature is \_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) 1 and 3 b) 2 and 7

c) 3 and 2 d) 2 and 1

1. The substance listed below that would exist in a gaseous phase at room temperature is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. octan-1-ol b) 2, 2, 4-trimethylpentane

c) dec-2- ene d) ethane

1. Aliphatic hydrocarbons have very similar physical properties. Identify the **FALSE statement** below.
2. The boiling point increases as the number of carbon atoms per molecule increases
3. Aliphatic hydrocarbons can be combusted in the presence of oxygen to release thermal energy.
4. Aliphatic hydrocarbons can be obtained from crude oil by fractional distillation.
5. Aliphatic hydrocarbons are soluble in solvents such as water, hydrochloric acid and sodium hydroxide solution.

9. The compound that is the most soluble in water is

a) ethanol b) pentan-1-ol

c) hexan-1-ol d) octan-3-ol

1. The compounds below that will be low in solubility in water will be \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_

a) ethanol, methanol b) Ethanoic acid, sucrose

c) acetylene, ethene d) methanoic acid, glucose

11. The statement that is **False** for an organic acid is \_\_\_\_\_\_\_\_

a) Their general form is RCOOH.

b) They have a small Ka value

c) They react with alcohols to form esters.

d) They have high solubility in water.

1. Choose the compounds below that have the lowest boiling point.
2. C4H10 b) C8H18

c) C2H5COOH d) CH3OH

13. The substance listed below that would readily dissolve in water is

a) CH3CH2CH2CH3 b) CH3OH

c) C6H6 d) CH3COOCH2CH3

1. Which of the following statements are TRUE for a 0.10 of Citric acid (C3H5(COOH)3(aq))?

|  |  |
| --- | --- |
| 1 | Polyprotic carboxylic acid |
| 2 | Gives Oranges their sour taste. |
| 3 | Carbon has oxidation number of -1 |
| 4 | Turns HOr orange. |

1. 1 and 2 b) 1, 2, and 3

c) 1, 3, and 4 d) 1, 2 and 4

15. From the organic halides listed below, the substance with the highest boiling point is \_\_\_\_\_\_\_\_\_\_\_\_\_

1. 1,1-dichloroethane b) 1,1-dibromoethane

c) 1,1-diiodoethane d) 1,1-difluoroethane

1. When students heated both propane ( C3H8(g) ) and acetaldehyde (CH3 CHO(l) ) in the laboratory, they discovered that

Propane boils at -42 oC and acetaldehyde boils at 20oC. The difference in boiling points is due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. the polar nature of acetaldehyde
2. stronger intramolecular forces of propane
3. weaker intramolecular forces of acetaldehyde
4. the polar nature of propane
5. The descriptions that apply to both chloro cyclobutane and 2-bromopentane are: \_\_\_\_\_\_\_, \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| a | Saturated | Aromatic | halogenated |
| b | Unsaturated | Aliphatic | cyclical |
| c | Alkanes | Halogenated | aliphatic |
| d | Saturated | Alkynes | cyclical |

18. Compounds that will be soluble in water includes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) alkenes and alkanes

b) alcohols and acids

c) alkynes and alkanes

d) esters and alkenes

19. Which member of the homologous series below will have the highest boiling point?

a) ethane

b) heptane

c) hexane

d) pentane

Solutions:

1. B
2. D
3. C
4. A
5. B
6. D
7. D
8. D
9. A
10. C
11. D
12. A
13. B
14. D
15. C
16. A
17. C
18. B
19. B