
Chapter – 4 (Carbon and Its Compounds) (Class 10)

Questions:

Question :1 How many covalent bonds are in C₂H₅?

- a. 6 covalent bonds .
- b. 8 covalent bonds.
- c. 7 Covalent bonds.
- d. 5 covalent bonds.

Answer :

(c.) 7 covalent bonds.

Question :2 What is the functional group in the Butanone?

- a. Ketone
- b. Aldehyde
- c. Ether
- d. Alcohol

Answer :

(a.) Ketone.

Question :3 When the bottom of the vessel is getting blackened on the outside while cooking, it shows that

- a. The food is cooked completely.
- b. The fuel is not burning completely.
- c. The food is not cooked.
- d. The fuel is burning completely.

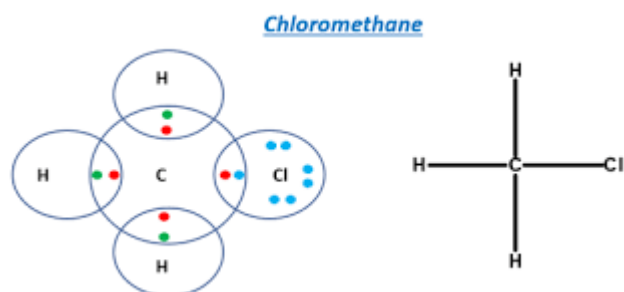
Answer :

(b.) The bottom of the vessel is getting blackened on the outside, then it means that the fuel is not burnt completely.

Question :4 Explain the nature of the challenge bond using the bond formation in CH₃Cl.

Answer :

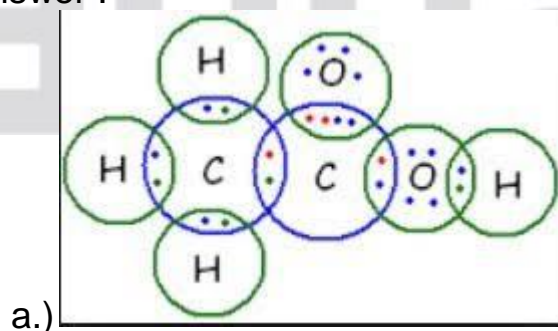
Carbon is tetravalent in nature. In the outermost shell, carbon has four electrons. Removal of these electrons needs more energy and gaining the four electrons needs more energy. To complete the octet, carbon needs to share the four electrons with other carbon atoms or different atoms. Carbon forms one bond with chlorine and three bonds with hydrogen.

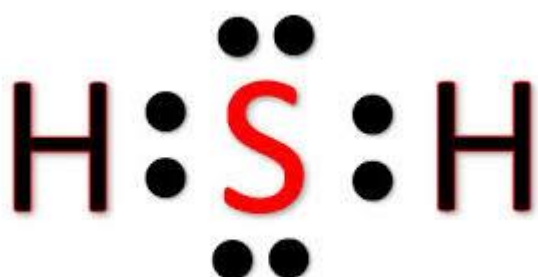


Question :5 Draw the cross dot structures of the following compounds.

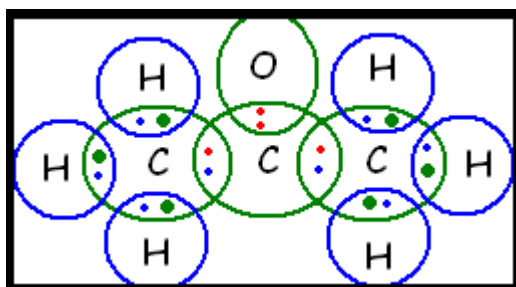
- a. Ethanoic acid.
- b. H₂S.
- c. Propanone.
- d. F₂.

Answer :

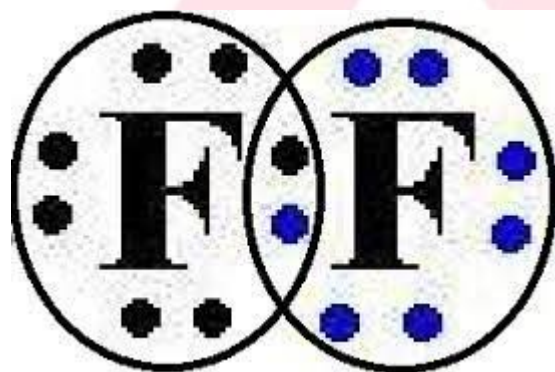




b.)



c.)



d.)

Question :6 What is homologous series? Explain with an example.

Answer :

A homologous series is a series of carbon compounds that have some chemical properties but different physical properties and the differences between two successive compounds is $-\text{CH}_2$.

For example : Alkanes family. The general formula of Alkane is $\text{C}_n\text{H}_{2n+2}$.

Methane CH_4

Ethane C_2H_6

Propane $\text{CH}_3\text{CH}_2\text{CH}_3$

Butane $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

Question :7 How can ethanol and ethanoic acid be differentiated on the basis of their physical and chemical properties?

Answer:

Chemical properties :

Ethanol is alcohol and ethanoic acid is carboxylic acid. When alcohol and carboxylic acid reacts with carbonates and bicarbonate than only carboxylic acid reacts with carbonates and bicarbonates and evolve the CO₂ gas that turns lime water milky.

Physical properties :

The melting point of ethanol is – 114.1 degree C and ethanoic acid is 16.6 degree C. Ethanoic acid melting point is below the room temperature it freezes during winters. Ethanol is liquid at room temperature but ethanoic acid is solid at room temperature Ethanol has pleasant smell and ethanoic acid is vinegar smell.

Question :8 In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?

Answer:

In the electrolytic refining of a metal M:

Anode → Impure metal M

Cathode → Pure metal M.

Electrolyte → Solution of salt of the metal M.

Question :9 Why are carbon and it's compound used as fuels for most applications?

Answer :

When the saturated carbon compounds burnt with air form a carbon dioxide, water with lot of energy and light. In this reaction no smoke will produce section less pollution. It is exothermic process. It is used as fuels because high calorific value.

Question :10 Explain the formation of scum when hard water is treated with soap.

Answer:

Soaps are the sodium or potassium salt of long chain of carboxylic acid. Hard water contains the chloride and sulphates of calcium and magnesium. When soap will add in the hard water form less lather so some amount of salt is unused. This insoluble salt is known as scum.

Question :11 What change will you test soap with litmus paper?

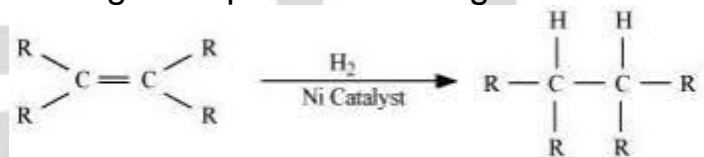
Answer :

Soap is basic in nature so red litmus turns blue but blue litmus remains same.

Question :12 What is hydrogenation? What is it's industrial applications?

Answer :

The addition of hydrogen on the unsaturated compounds are known as hydrogenation. It is a addition reaction in the presence of Ni/Pt/Pd as catalyst. Unsaturated compounds convert into saturated compounds. Through this process the vegetable oil is converted into ghee.



Question :13 Which of the following hydrocarbons undergo addition reactions:

Answer:

Unsaturated hydrocarbons undergo addition reactions The unsaturated hydrocarbons general formula is C_nH_{2n-2} or C_nH_{2n} .

I'm the given compounds C_3H_6 and C_2H_2 undergo addition reactions while C_2H_6 , C_2H_8 and CH_4 are saturated hydrocarbons.

Question :14 Give a test that can be used to differentiate chemically between butter and cooking oil.

Answer :

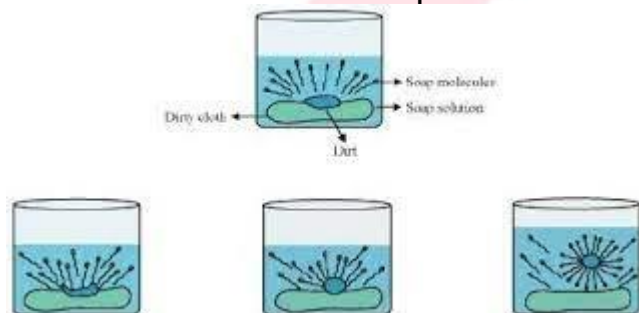
Cooking oil is unsaturated fats but butter is saturated. By hydrogenation, oil will react but butter will not react.

Question :15 Explain the mechanism of the cleaning action of soaps.

Answer :

Cleansing action of soaps:

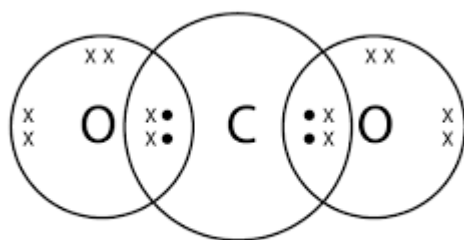
Soap contains the two parts. One part is hydrophobic and the other is hydrophilic. Soaps are the sodium or potassium salt of long chain of carboxylic acid. When the dirty clothes dip in the soap solution, the hydrophobic ends attach the dirt and form a big cluster. This cluster is known as micelle and trap the dirt.



In-text questions:

Que.1 What is the electron dot structure of carbon dioxide

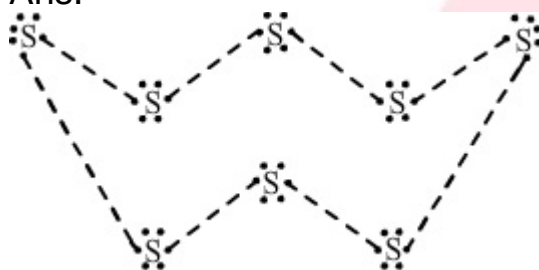
Ans. Cross dot structure of CO₂ is



Electron dot structure of Carbon dioxide

Que. 2 What is the direction structure of a molecule of Sulphur?

Ans.



Que.3 How many structural isomers possible for pentane?

Ans.

Three structural isomers for pentane.

- I. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- II. $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- III. $\text{C}(\text{CH}_3)_4$

Que.4 What are the two properties of carbon to form a large number of compounds?

Ans.

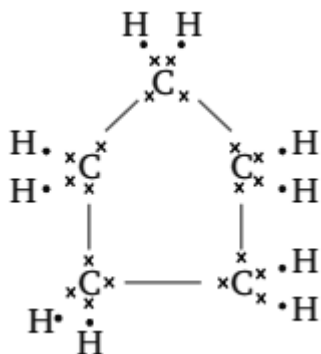
The two properties of carbon to form a large number of compounds are:

- I. Catenation – It is ability to form a bond with itself. It is the self linking ability

- II. Tetravalency – Carbon can make only four bonds. That arrangement of the atoms are known as tetravalency.

Que.5 What is cross dot structure of cyclopentane?

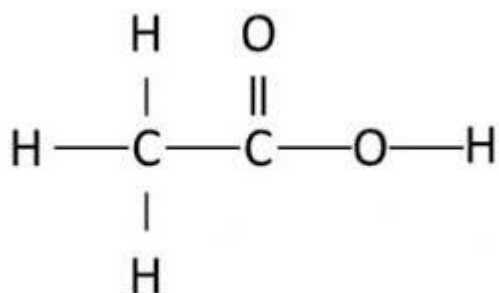
Ans.



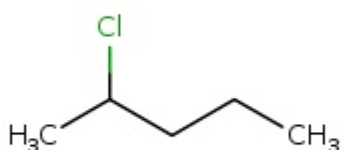
Que. 6 Draw the structure for the following compounds.

- I. Ethanoic acid.
- II. 2-Chloropentane.
- III. Hexanal
- IV. Butanone.

Ans.

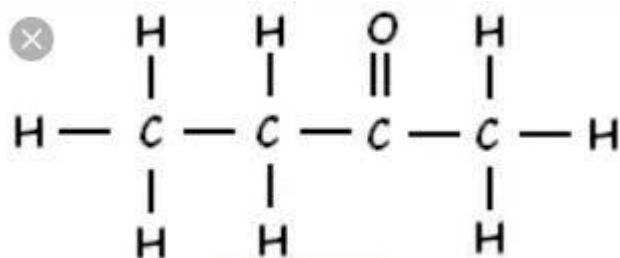
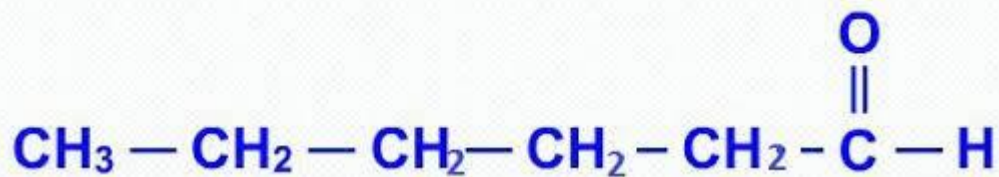


i.)



ii.)

iii.)

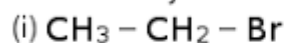


iv.)

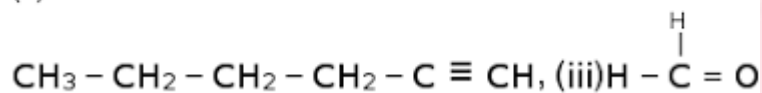
Butanone

Que.7

How would you name the following compounds?



(ii)



Ans.

- I. Bromoethane.
- II. Hexyne.
- III. Methanal.

Que.8 Why is mixture of ethyne and air is not used?

Ans.

When ethyne is burnt in air, it gives a sooty flame due to unsaturation nature. If ethyne is burnt with oxygen, it gives a clear flame with temperature 2500 degree C because of complete combustion. Oxy-acetylene flame is used for welding. It is difficult to attain this much high temperature without mixing oxygen that's why a mixture of ethyne and air is not used.

Que.9 Distinguish experimentally between an alcohol and carboxylic acid.

Ans.

When alcohol and carboxylic acid reacts with carbonates and bicarbonates and evolve the CO₂ gas that turns lime water milky.

Que. 10 What are oxidising agents?

Ans.

An oxidizing agent is a reactant that removes electrons from other reactants during a redox reaction For example: Alkaline potassium permanganate and acidified potassium dichromate.

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