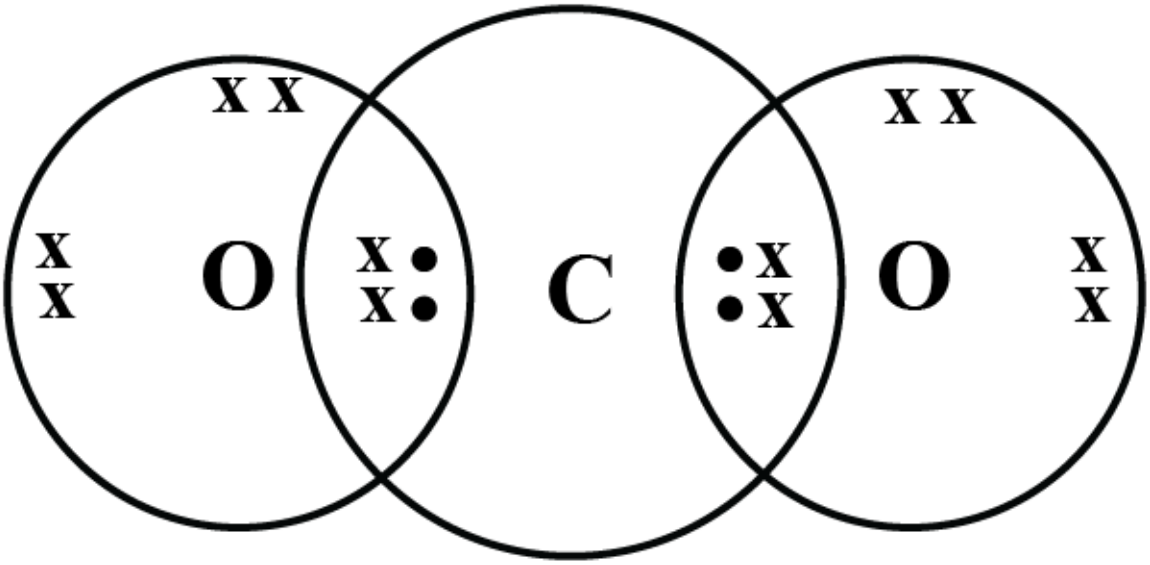
Intext Exercise 1

Question 1:

What is the electron dot structure of carbon dioxide?

Solution 1:

Cross dot structure of CO_2 is

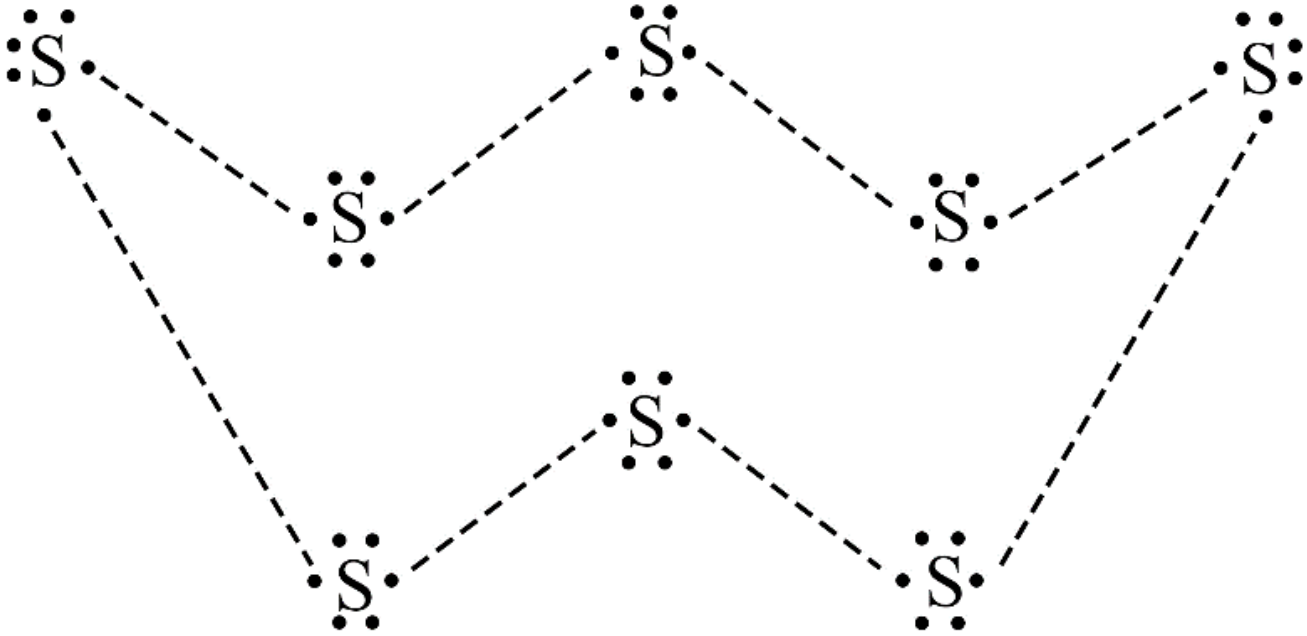


Question 2:

What is the dot structure of a molecule of sulphur?

Solution 2:

Dot structure of a S_8 molecule:



Intext Exercise 2

Question 1:
How many structural isomers possible for pentane?
Solution 1:
Three structural isomers for pentane.
(i) $CH_3CH_2CH_2CH_2CH_3$
(ii) $CH_3CH(CH_3)CH_2CH_3$
(iii) $C(CH_3)_4$

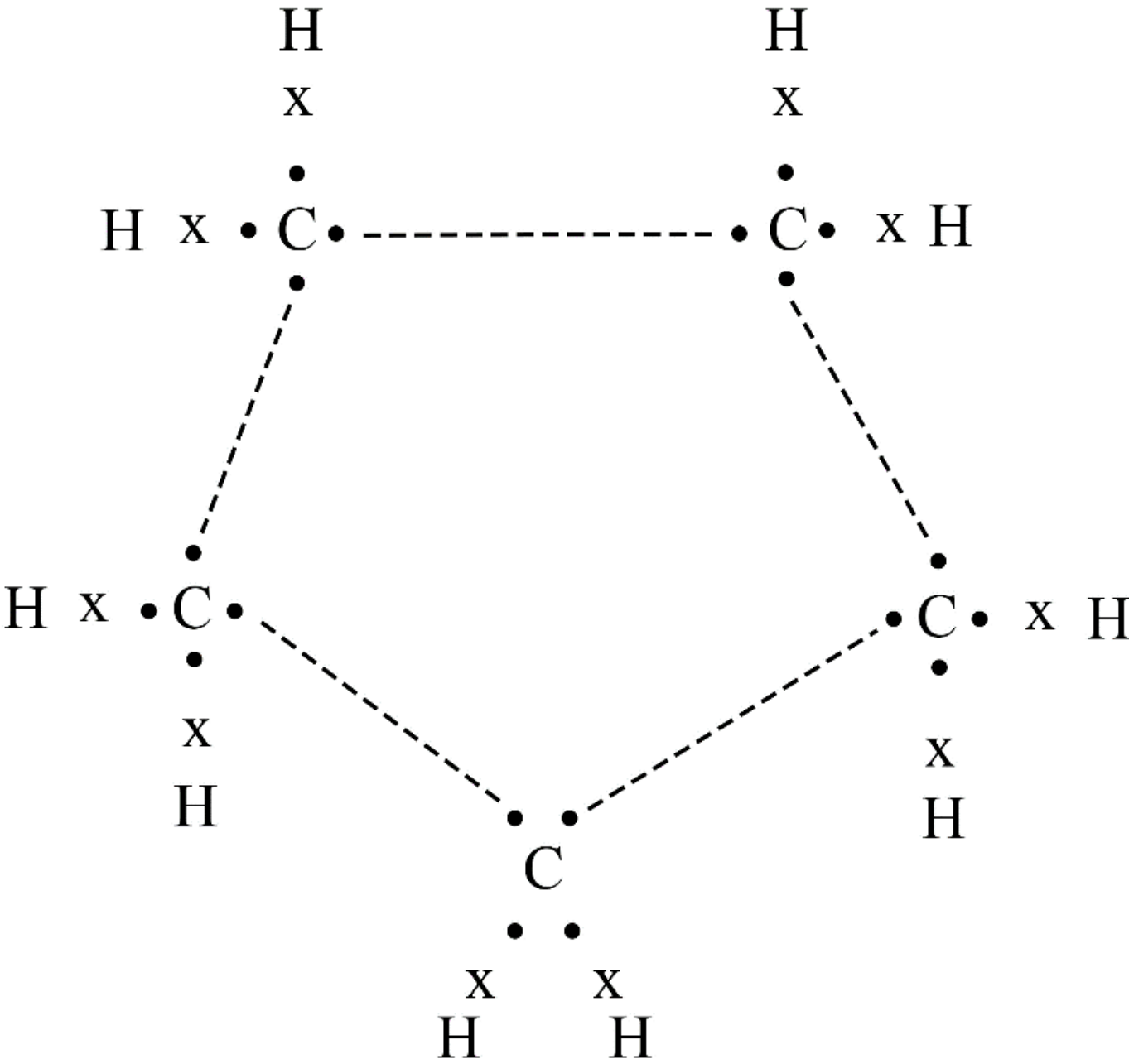
Question 2:
What are the two properties of carbon to form a large number of compounds?

Solution 2:
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 tertravalency.

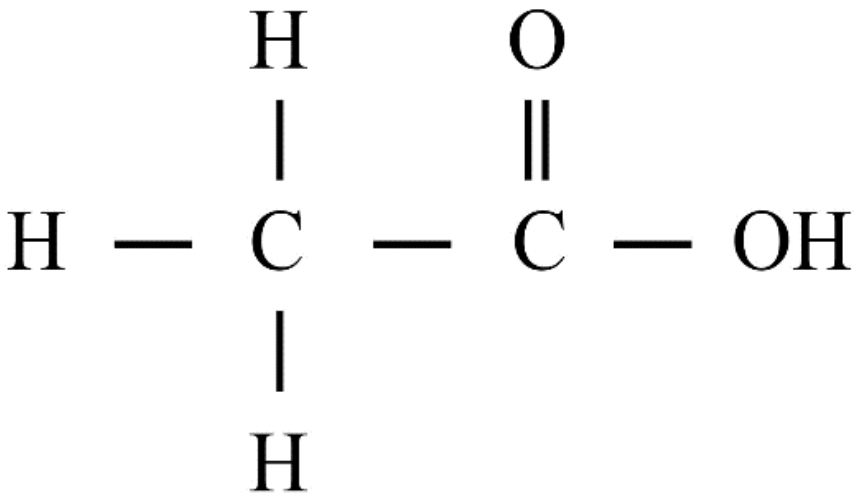
Question 3:
What is the cross dot structure of cyclopentane?
Solution 3:
The formula for cyclopentane is C_5H_{10}.



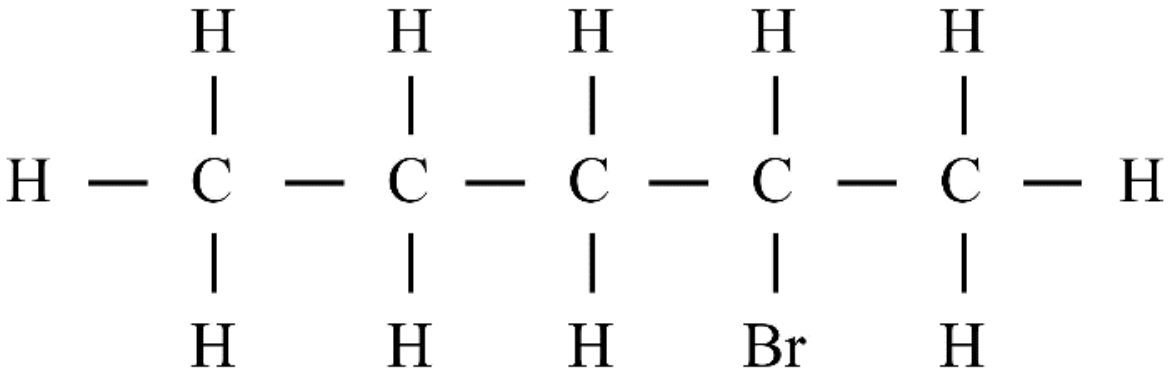
Question 4:
Draw the structures for the following compounds.

(i) Ethanoic acid
(ii) 2-Chloropentane
(iii) Hexanal
(iv) Butanone

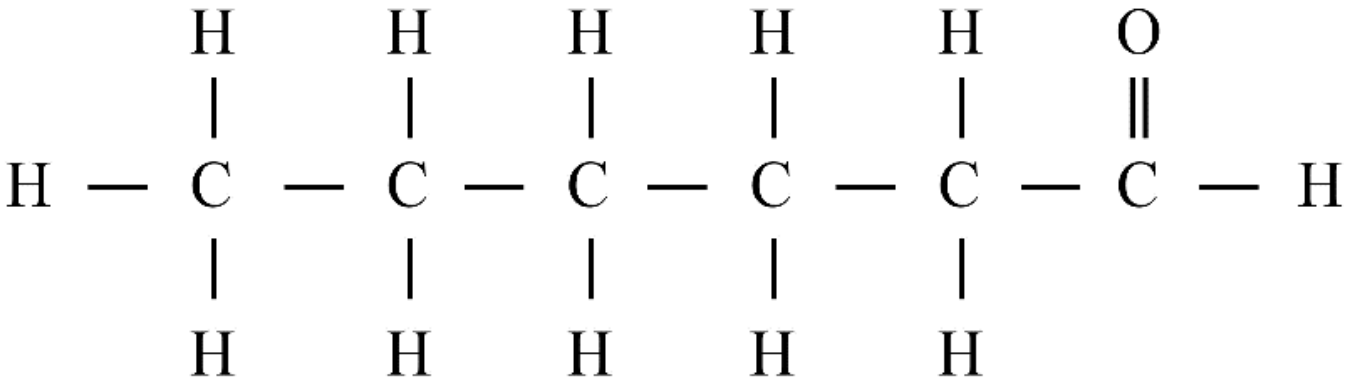
Solution 4:
(i)



(ii)
$CH_3CH_2CH_2CH(Br)CH_3$



(iii)



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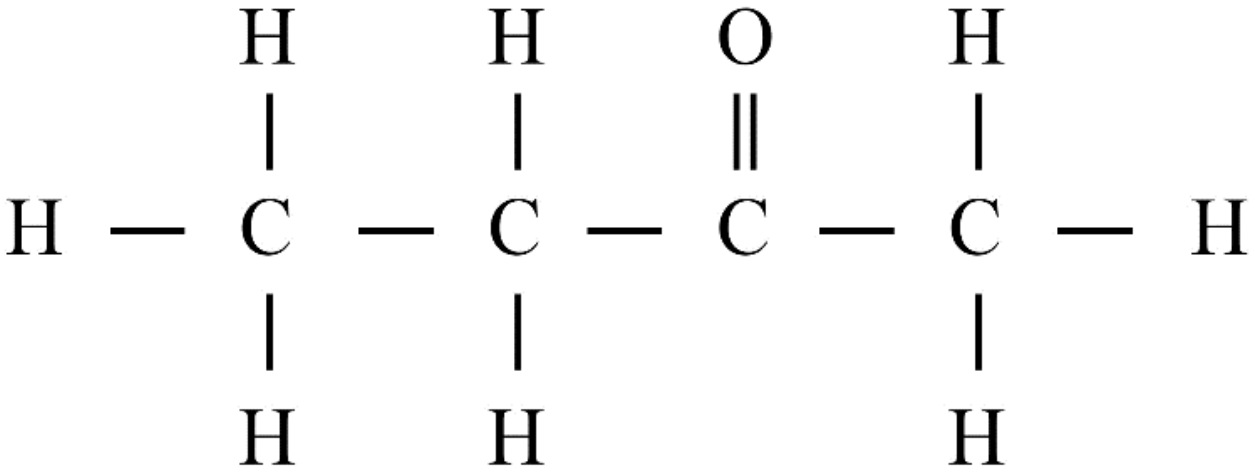
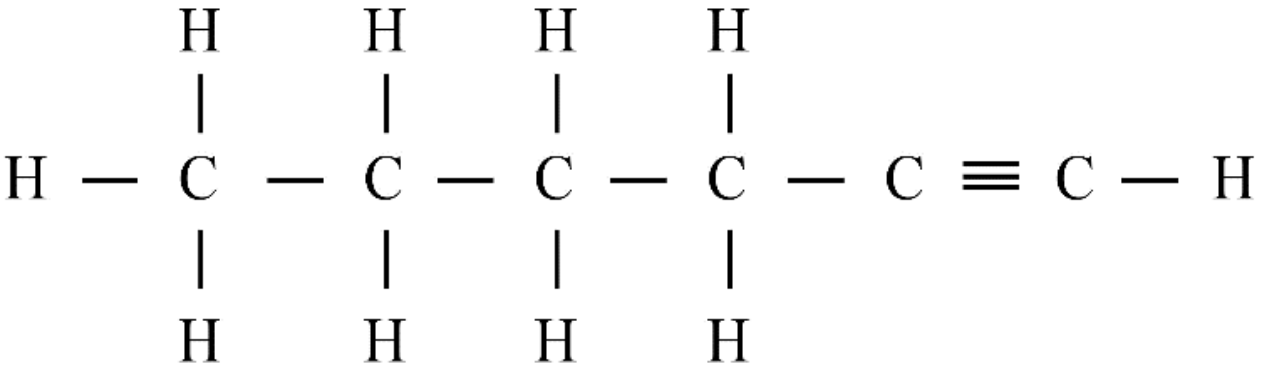
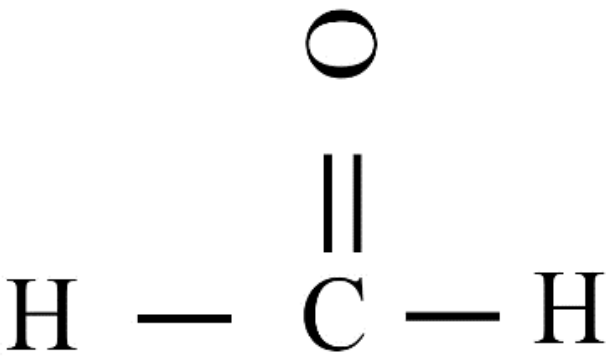


Question 5 :
Write the name the following compounds.
(i)

(ii)



(iii)



Solution 5:
(i) Bromoethane
(ii) Hexyne
(iii) Methanal

Intext Exercise 3

Question 1:
Why a mixture of ethyne and air is not used?
Solution 1:
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°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.

Question 2:
Does the conversion of ethanol to ethanoic acid an oxidation reaction?
Solution 2:

The conversion of ethanol to ethanoic acid by the addition of oxygen to ethanol. it is an oxidation reaction.

$C_2H_5OH \xrightarrow{[O]} CH_3COOH$

Intext Exercise 4

Question 1:
Distinguish experimentally between an alcohol and carboxylic acid.
Solution 1:
When alcohol and carboxylic acid reacts with carbonates and bicarbonates than only carboxlylic acid reacts with carbonates and bicarbonates and evolve the CO_2 gas that turns lime water milky.

Question 2:
What are oxidising agents?
Solution 2:
An oxidizing agent is a reactant that removes electrons from other reactants during a redox reaction. for example: Alkaline potassium permanganate ($KMnO_4$) and acidified potassium dichromate($K_2Cr_2O_7$)

Intext Exercise 5

Question 1:

Would you be able to check if water is hard by using a detergent?

Solution 1:

Soaps are the sodium or potassium salt of long chain of carboxylic acid. Detergents are ammonium or sulphonate salts of long chain hydrocarbons. 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.

Detergent will give the good amount of lather in hard water as well as soft water. we can't identify through this that water is hard or soft.

Question 2:

People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?

Solution 2:

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

NCERT Exercises

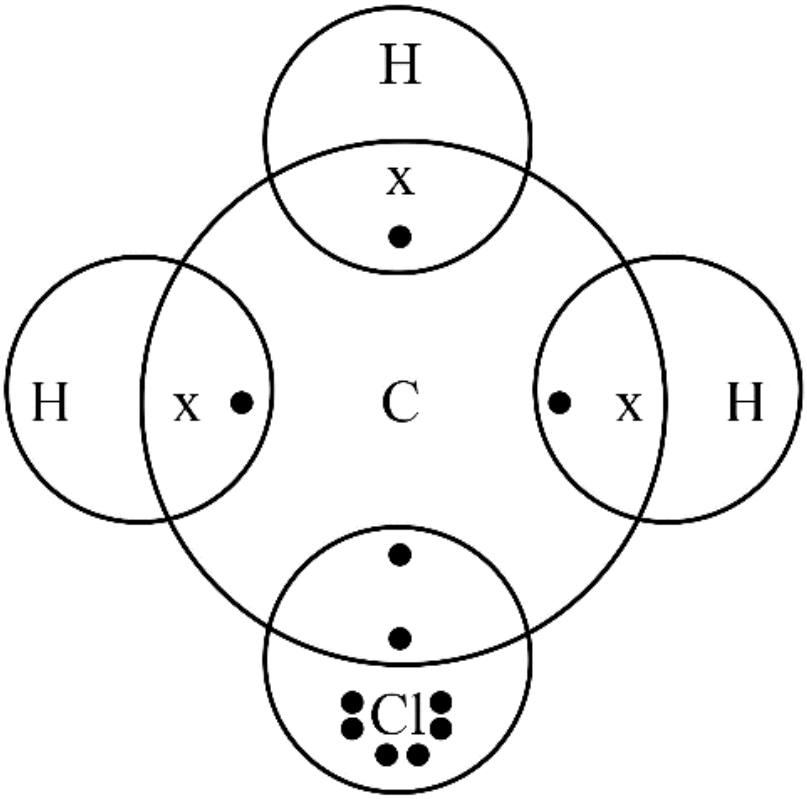
Question 1:
How many covalent bonds are in C_2H_6?
(a) 6 covalent bonds.
(b) 8 covalent bonds.
(c) 7 covalent bonds.
(d) 5 covalent bonds.
Solution 1:
(c) 7 covalent bonds.

Question 2:
What is the functional group in the Butanone?
(a) Ketone
(b) aldehyde.
(c) Ether
(d) alcohol.
Solution 2:
(a) ketone.

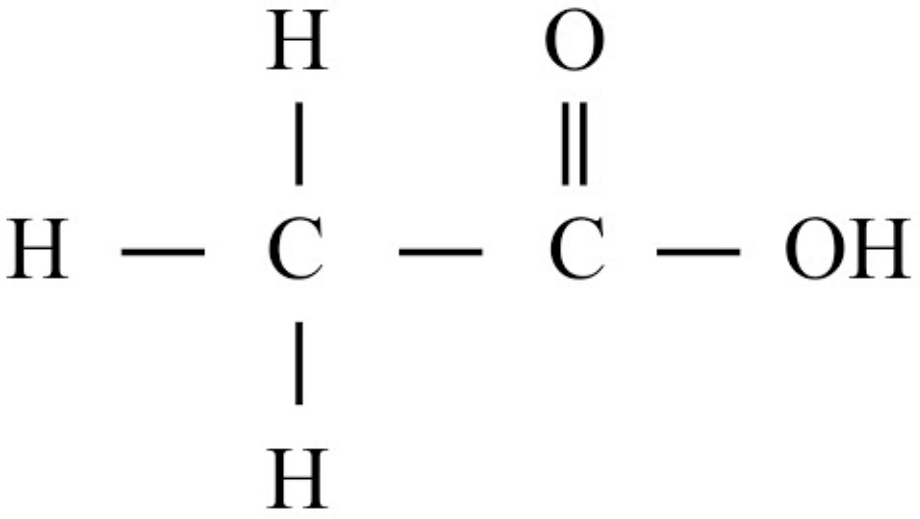
Question 3:
When the bottom of the vessel is getting blackened on the outside while cooking, it shows that
(a) the food is cooked completely.
(b) the fuel is not burning completely.
(c) the food is not cooked.
(d) the fuel is burning completely.
Solution 3:
(b) The bottom of the vessel is getting blackened on the outside, then it means that the fuel is not burnt completely.

Question 4:
Explain the nature of the covalent bond using the bond formation in CH_3Cl.
Solution 4:
Carbon is tetravalent in nature. In the outermost shell, carbon have four electrons removal of these electrons needs more energy and gain the four electrons needs more energy. To

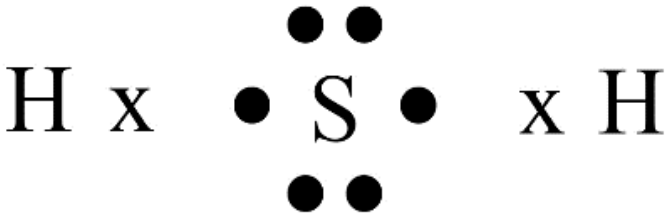
complete the octet, carbon needs to share the four electrons with other carbon atoms or different atoms. Carbon forms one bond with chlorine and three bonds with hydrogen.



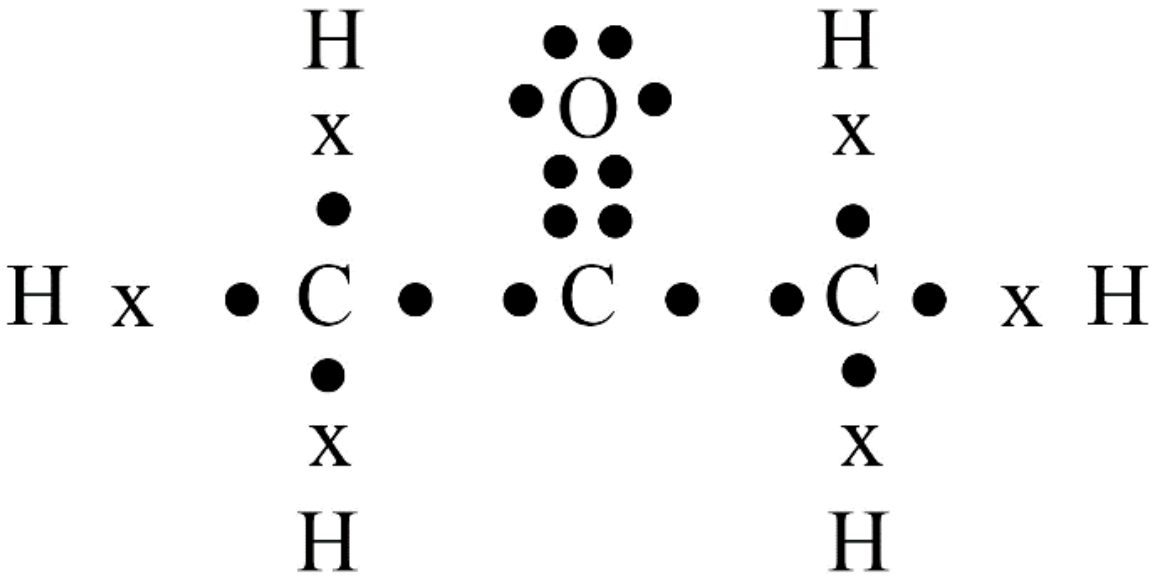
Question 5:
Draw the cross dot structures of the following compounds.
(a) Ethanoic acid.
(b) H_2S.
(c) Propanone.
(d) F_2.
Solution 5:
(a)



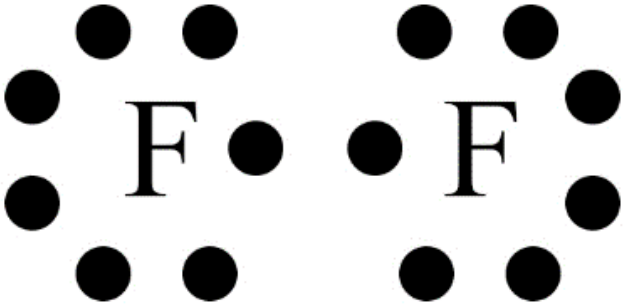
(b) H_2S



(c) Propanone



(d) F_2



Question 6:
What is a homologous series? Explain with an example.
Solution 6:
A homologous series is a series of carbon compounds that have same chemical properties but different physical properties and the differences between two successive compounds is $-CH_2$.

For example : Alkanes family. The general formula of Alkane is C_nH_{2n+2}.
Methane CH_4
Ethane CH_3CH_3
Propane $CH_3CH_2CH_3$
Butane $CH_3CH_2CH_2CH_3$

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

Physical properties:

The melting point of ethanol is -114.1 °C and ethanoic acid is 16.6 °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.

Chemical Properties:

Ethanol is alcohol and ethanoic acid is carboxylic acid. When alcohol and carboxylic acid reacts with carbonates and bicarbonates than only carboxlylic acid reacts with carbonates and bicarbonates and evolve the CO_2 gas that turns lime water milky.

$CH_3COOH + NaHCO_3$ or Na_2CO_3 $\rightarrow$ $CH_3COONa + CO_2 + H_2O$

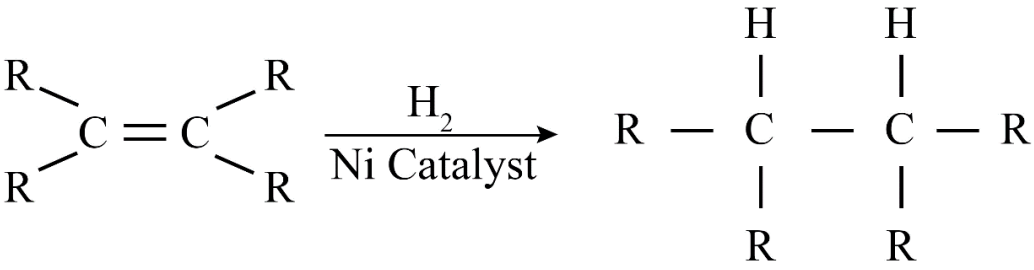
Question 8:
In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte?
Solution 8:
In the electrolytic refining of a metal M:
Anode → Impure metal M
Cathode → Pure metal M
Electrolyte → Solution of salt of the metal M

Question 9:
Why are carbon and its compounds used as fuels for most applications?
Solution 9:
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 so 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.
Solution 10:
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 observe if you test soap with litmus paper (red and blue)?
Solution 11:
Soap is basic in nature so red litmus turns blue but blue litmus remains same.

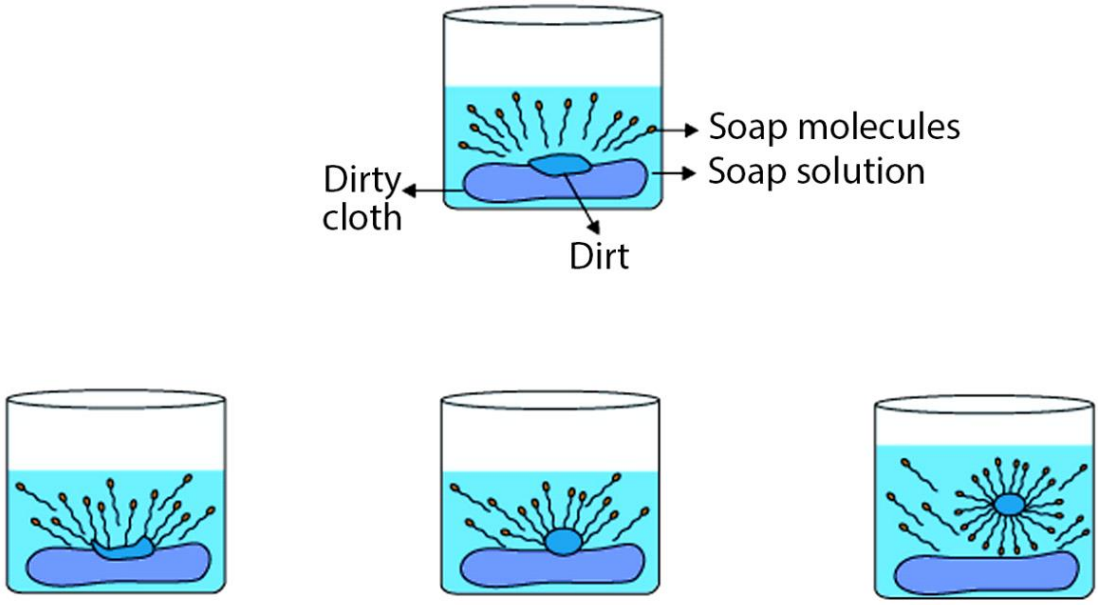
Question 12:
What is hydrogenation? What is its industrial application?
Solution 12:
The addition of hydrogen on the unsaturated compounds are known as hydrogenation. it is a addition reaction in the presence of Ni/Pt/Pd as catalyst. Unsaturated compounds convert into the saturated compounds. Through this process the vegetable oil is converts into ghee.



Question 13:
Which of the following hydrocarbons undergo addition reactions:
C_2H_6, C_3H_8, C_3H_6, C_2H_2 and CH_4.
Solution 13:
Unsaturated hydrocarbons undergo addition reactions. The unsaturated hydrocarbons General formula is $C_nH2n\text{-}2$ or C_nH_{2n}.
In 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 hydrocarbon.

Question 14:
Give a test that can be used to differentiate chemically between butter and cooking oil.
Solution 14:
Cooking oil is unsaturated fats but the butter is saturated. By hydrogenation, oil will reacts but butter will not reacts.

Question 15:
Explain the mechanism of the cleaning action of soaps.
Solution 15:
Cleansing action of soaps:
Soap contains the two parts. One part is hydrophilic and other part is hydrophobic. Soaps are the sodium or potassium salt of long chain of carboxylic acid. When the dirty clothes dip in the soap solution. the hydrophoic ends attach the dirt and form a big cluster. This cluster is known as micelle and trap the dirt.


Soap molecules
Soap solution
Dirty cloth
Dirt