

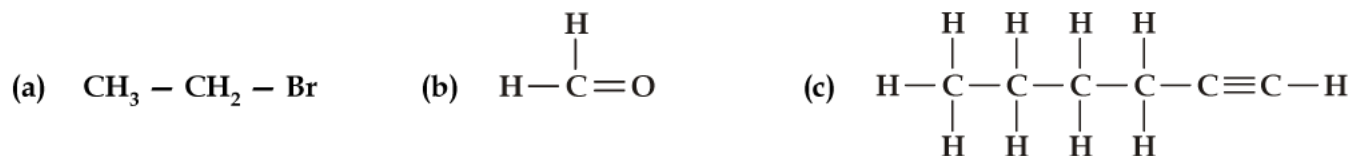
- Q1.** What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?
- Q2.** Ethane, with the molecular formula C_2H_6 has
(a) 6 covalent bonds (b) 7 covalent bonds (c) 8 covalent bonds (d) 9 covalent bonds
- Q3.** Explain the nature of the covalent bond using the bond formation in CH_3Cl .
- Q4.** Butanone is a four-carbon compound with the functional group
(a) Carboxylic acid (b) aldehyde (c) ketone (d) alcohol
- Q5.** While cooking, if the bottom of the vessel is getting blackened on the outside, it means that
(a) the food is not cooked completely (b) the fuel is not burning completely
(c) the fuel is wet (d) the fuel is burning completely
- Q6.** Would you be able to check if water is hard by using a detergent?
- Q7.** 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?
- Q8.** What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur? [Hint: The eight atoms of sulphur are joined together in the form of a ring.]
- Q9.** What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?
- Q10.** What will be the formula and electron dot structure of cyclopentane?
- Q11.** Draw the electron dot structures for
(a) ethanoic acid (b) H_2S (c) propanone (d) F_2
- Q12.** What is an homologous series? Explain with an example.
- Q13.** A mixture of oxygen and ethyne is burnt for welding. Can you tell why a mixture of ethyne and air is not used?
- Q14.** Why is the conversion of ethanol to ethanoic acid an oxidation reaction?
- Q15.** Why are carbon and its compounds used as fuels for most applications?
- Q16.** What is hydrogenation? What is its industrial application?
- Q17.** Give a test that can be used to differentiate chemically between butter and cooking oil.
- Q18.** Which of the following hydrocarbons undergo addition reactions.
 C_2H_6 , C_3H_8 , C_3H_6 , C_2H_2 and CH_4 .
- Q19.** How would you distinguish experimentally between an alcohol and a carboxylic acid?
- Q20.** What are oxidising agents?

Q21. Explain the formation of scum when hard water is treated with soap.

Q22. What change will you observe if you test soap with litmus paper (red and blue)?

Q23. How many structural isomers can you draw for pentane?

Q24. How would you name the following compounds?



Q25. How can ethanol and ethanoic acid be differentiated on the basis of their physical and chemical properties?

Q26. Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents such as ethanol also?

Q27. Explain the mechanism of the cleaning action of soaps.

Q28. Draw the structures for the following compounds:

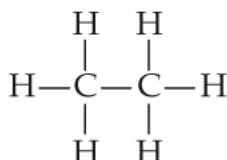
(a) Ethanoic acid (b) Bromopentane (c) Butanone (d) Hexanal

Are structural isomers possible for bromopentane?

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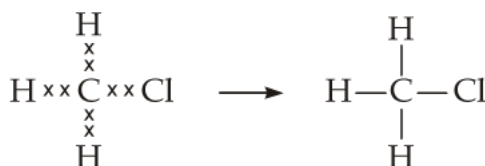


S2. Ethane has the structure



All the bonds are covalent. Thus, it has seven covalent bonds. Option (b) is correct.

S3. Covalent bond is formed by sharing of electrons between two atoms. It is non-ionic in nature.



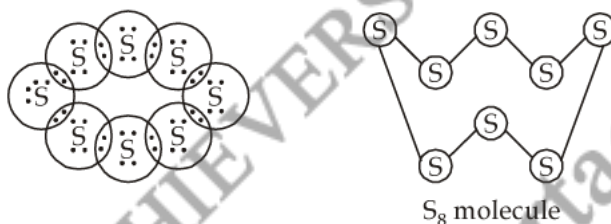
S4. Butanone has the formula $\text{CH}_3\text{COCH}_2\text{CH}_3$. Thus, it has ketone as the functional group. Option (c) is correct.

S5. It is due to improper burning of fuel that the cooking vessel gets blackened on the outside. Thus option (b) is correct.

S6. No, we would not be able to check if water is hard by using a detergent.

S7. Agitation is necessary to obtain complete micelle formation and the emulsion of oil in water so that the whole of dirt is removed on rinsing with water.

S8.



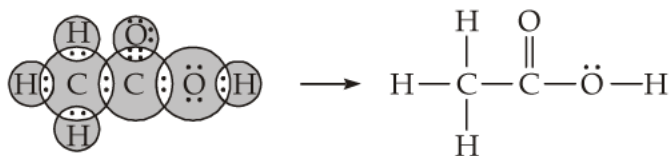
S9. The two properties are:

- Catenation, the ability to form bonds with other atoms of carbon.
- Tetravalency of carbon.

S10. Formula of cyclopentane is C_5H_{10} . The electron dot structure of cyclopentane is:



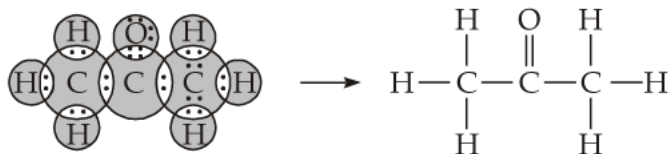
S11. (a) Ethanoic acid



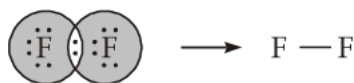
(b) H_2S



(c) Propanone



(d) F_2

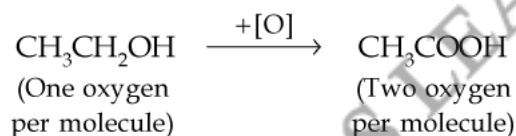


S12. Series of compounds in which the same functional group substitutes for hydrogen in a carbon chain is called a homologous series. CH_3OH , $\text{C}_2\text{H}_5\text{OH}$ and $\text{C}_3\text{H}_7\text{OH}$ is an example of homologous series. The difference between the formulae of any two successive members is $-\text{CH}_2$ while the difference between the molecular masses is 14 u.

S13. Combustion of ethyne with oxygen is an exothermic reaction. A lot of heat is evolved which is used in welding.

Air contains a mixture of oxygen + nitrogen. Nitrogen does not help in combustion. Therefore, heat evolved when ethyne burns in air will be much less than when it burns in oxygen.

S14. Oxygen has been added to the molecule of ethanol in the conversion to ethanoic acid.



Therefore, it is an oxidation reaction.

S15. Carbon on combustion gives carbon dioxide and water. This reaction is accompanied by evolution of heat and light. The same is true for compounds of carbon. That is why carbon and its compounds are used as fuels for most applications.

S16. Unsaturated hydrocarbons add hydrogen in the presence of catalysts such as palladium or nickel to give saturated hydrocarbons. This process is called hydrogenation. It is commonly used in the hydrogenation of vegetable oils using nickel as catalyst, to produce 'vanaspati ghee'.

S17. Butter and cooking oil can be differentiated with the help of bromine water test. Cooking oil will decolourise the red colour of bromine water on shaking while butter will not.

S18. Unsaturated hydrocarbons undergo addition reactions: C_3H_6 , C_2H_2 .

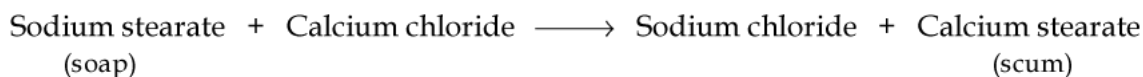
S19. Take the samples in two test tubes. Add 5 mL of saturated solution of sodium bicarbonate solution to the two test tubes separately.

The tube in which a brisk effervescence, due to the evolution of carbon dioxide, takes place contains the carboxylic acid.

Thus, the other tube contains the alcohol.

S20. Substances which bring about oxidation of substance (addition of oxygen) are called *oxidising agents*. For example, alkaline KMnO_4 or acidified $\text{K}_2\text{Cr}_2\text{O}_7$ solution is an oxidising agent for the conversion of ethanol to ethanoic acid.

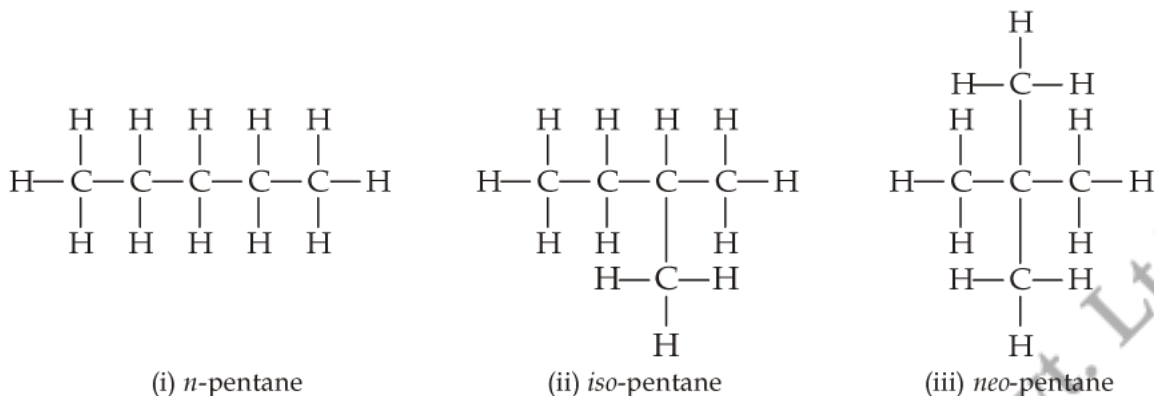
S21. Hard water contains hydrogencarbonates, chlorides and sulphates of calcium and magnesium which react with soap to form scum. For example, calcium chloride reacts with soap to form scum.



Formation of scum hinders the formation of foam. Soap is thus unable to clean in hard water.

S22. Soap is sodium salt of fatty acid (like stearic acid). It is obtained by treatment of oil with caustic soda. Sodium stearate (soap) is thus a salt of weak acid and strong base. Its water solution will be slightly alkaline and will turn red litmus blue.

S23. The isomers are as under:

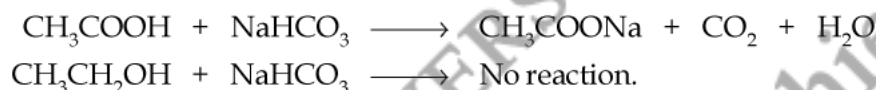


S24. (a) Bromoethane (b) Methanal (c) Hexyne

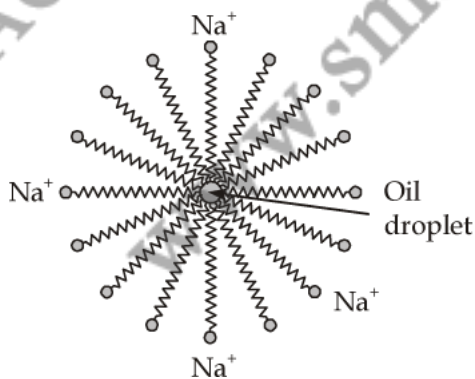
S25. **On the basis of physical properties:** Melting and boiling points of the two compounds are different. By determining their m.p. and b.p. the compounds can be differentiated. The values are given as under:

Compound	Melting point (K)	Boiling point (K)
Ethanol	156	351
Ethanoic acid	290	391

On the basis of chemical properties: Ethanoic acid reacts with sodium hydrogencarbonate liberating carbon dioxide while ethanol does not

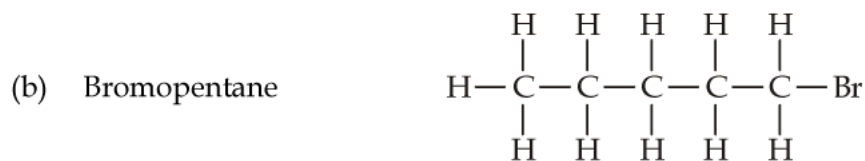


S26. Soap is sodium salt of long chain fatty acid. Two ends of soap molecule have differing properties. The ionic end is hydrophilic *i.e.*, it dissolves in water while the hydrocarbon chain is hydrophobic *i.e.*, it dissolves in hydrocarbon. The hydrocarbon chains are oriented towards the oil droplet while the ionic ends are oriented towards water.

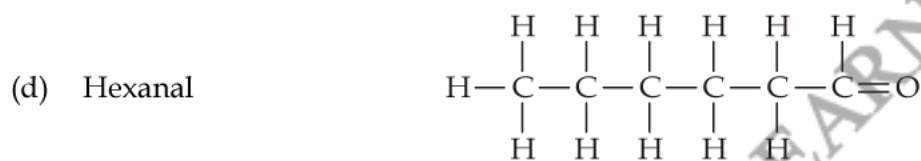
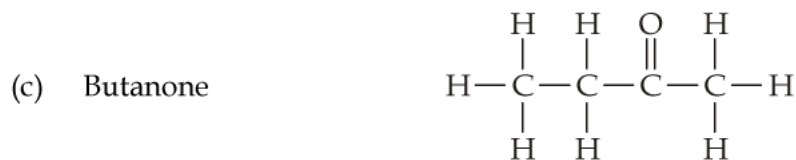
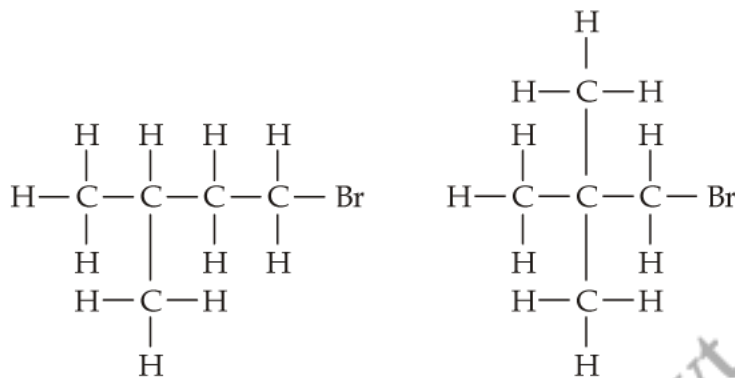


S27. Soaps are sodium salts of fatty acids. The two ends of molecule of soap behave differently. The ionic end is hydrophilic and it is oriented towards water. The other hydrocarbon end is hydrophobic and it is oriented towards dirt which is only in nature. A micelle formation around the oily dirt takes place. When flushed with excess water, the micelle containing the dirt is removed, thus cleaning the clothes.

S28. Structures of compounds are given as under:



Structural isomers are possible for bromopentane. The other two isomers are:



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