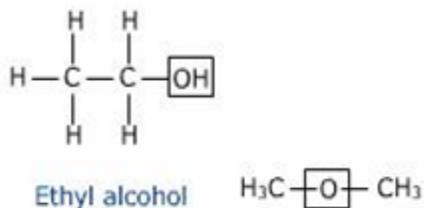




4. An alcohol and an ether have same molecular formula  $C_2H_6O$ . Draw their structural formula, indicating their functional groups.

Ans:



Ether

-OH is the functional group in ethyl alcohol while O is the functional group in ether. Ethyl alcohol is an isomer of dimethyl ether.

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

Ans: Detergents are ammonium or sulphonate salts of long chain carboxylic acids. Unlike soap, they do not react with calcium and magnesium ions present in hard water to form scum. They give a good amount of lather irrespective of whether the water is hard or soft. This means that detergents can be used for both soft and hard water. Therefore, it cannot be used to check whether the water is hard or not.

6. What are homologous series? Write a short note.

Ans: The extremely large numbers of carbon compounds discovered so far are better and more systematically studied by classifying them into families. Such groupings contain members, which are similar to one another in chemical properties, due to their common functional groups. These families form homologous series.

The properties of such homologous series are:

1. Members of the same family have a general formula. For e.g., alkanes the general formula is  $C_nH_{2n+2}$  for alkenes the general formula is  $C_nH_{2n}$  for alkyne the general formula is  $C_nH_{2n-2}$
2. They have common methods of preparation
3. Their chemical properties are similar

4. Their physical properties like colour, solubility, density, melting and boiling points etc. are graded.
5. Each member differs from the next by a  $\text{CH}_2$  moiety in its formula

7. The bond between two identical non metallic atoms has a pair of electron?
  - A. Unequally shared between two atoms.
  - B. Transferred completely from one atom to another.
  - C. With identical spins
  - D. Equally shared between them.

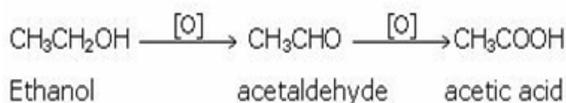
Ans: D

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

Ans: Soap does not work properly when the water is hard. A soap is a sodium or potassium salt of long chain fatty acids. Hard water contains salts of calcium and magnesium. When soap is added to hard water, calcium and magnesium ions present in water displace sodium or potassium ions from the soap molecules forming an insoluble substance called scum. A lot of soap is wasted in the process.

9. An organic compound A with formula  $\text{C}_2\text{H}_6\text{O}$  gives the compound B with same number of carbon atoms when oxidized, which further undergoes oxidation to acetic acid, identify the compound A.

Ans: Compound A is ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ). It undergoes oxidation to give acetaldehyde ( $\text{CH}_3\text{CHO}$ ) with the same number of carbon atoms. Acetaldehyde further undergoes oxidation to give acetic acid ( $\text{CH}_3\text{COOH}$ ), again with the same number of carbon atoms.



10. Which of the following salt when dissolved in water produces hard water.
- Calcium sulphate
  - Magnesium bicarbonate
  - Calcium chloride
  - Any of the above

Ans: D

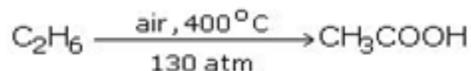
11. Why graphite has high melting point?

Ans: Within each layer of graphite, every carbon atom is joined to three others by strong covalent bonds. This forms a pattern of interlocking hexagonal rings. The carbon atoms are difficult to separate from one another. So graphite also has high melting point.

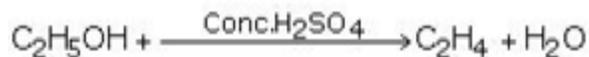
12. How do you convert:
- Ethane to ethanoic acid
  - Ethanol to ethene.

Give conditions and equations relevant to these conversions.

Ans: 1) Ethane to ethanoic acid: Ethane when heated with air at 400°C under 130 atm gets converted to ethanoic acid or acetic acid.



3) Ethanol gets dehydrated by concentrated  $\text{H}_2\text{SO}_4$  at 170° C to ethene.



13. Which of the following has the weakest carbon-carbon strength?
- A.  $C_2H_2$
  - B.  $C_2H_4$
  - C.  $C_2H_6$
  - D. All have the same bond strength

Ans: A.

14. What is denatured alcohol?

Ans. Alcohol which is made unfit for the drinking purposes is called denatured alcohol. It is ethyl alcohol ( $C_2H_5OH$ ) mixed with poisonous substances like methanol, copper sulphate, etc.

15. What happens when a mixture of ethyl alcohol, acetic acid and concentrated  $H_2SO_4$  is heated?

Ans: When a mixture of ethyl alcohol, acetic acid and concentrated  $H_2SO_4$  is heated ester formation takes place with the elimination of a water molecule as follows.

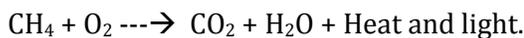


16. Detergents are sodium or potassium salts of long chain of:-
- A. Aldehydes
  - B. Ketones
  - C. Carboxylic acid
  - D. Sulphonic acid

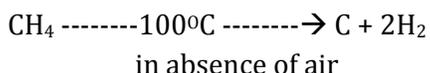
Ans D

17. How is combustion different from pyrolysis?

Ans: Combustion means heating a compound in the presence of excess or limited supply of air, e.g., combustion of methane gives carbon dioxide and water.

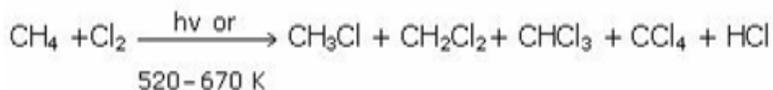


Pyrolysis means the decomposition of a hydrocarbon into its element on strong heating in the absence of air, e.g., pyrolysis of methane gives carbon and hydrogen.

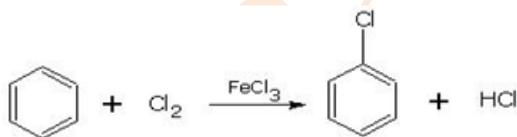


18. Write a short note on substitution reactions?

Ans: The replacement of a hydrogen atom of a hydrocarbon molecule by an atom or a group of atoms is known as substitution reaction. Alkanes, due to their structure, can undergo substitution reactions only in the presence of sunlight or ultraviolet light or at high temperatures. For example, methane reacts with chlorine either on heating at 520 – 670 K or on exposure to sunlight to give a mixture of chloromethane.



Arenes, though unsaturated, also undergoes substitution reactions due to special stability associated with electron cloud.

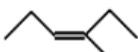
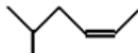
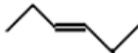


19. Which of the following substance is added to denature ethonol?

- A. Methanol
- B. Pyridine
- C. Copper sulphate
- D. All of them

Ans D

20. Which is 5-methylhex -2- ene?

- A. 
- B. 
- C. 
- D. 

Ans B

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