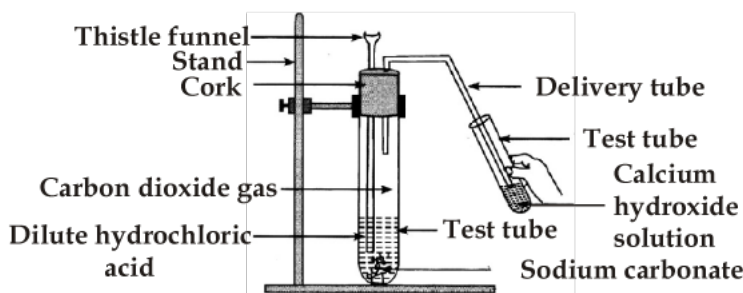


- Q1.** An organic compound A on heating with concentrated H_2SO_4 forms a compound B which on addition of one mole of hydrogen in presence of Ni forms a compound C. One mole of compound C on combustion forms two moles of CO_2 and three moles of H_2SO_4 . Identify the compounds A, B and C and write the chemical equations of the reactions involved.
- Q2.** Explain the given reactions with the examples
- (a) Hydrogenation reaction (b) Oxidation reaction (c) Substitution reaction
(d) Saponification reaction (e) Combustion reaction
- Q3.** Draw the possible isomers of the compound with molecular formula $\text{C}_3\text{H}_6\text{O}$ and also give their electron dot structures.
- Q4.** How would you bring about the following conversions? Name the process and write the reaction involved.
- (a) ethanol to ethene. (b) propanol to propanoic acid.
Write the reactions.
- Q5.** A compound C (molecular formula, $\text{C}_2\text{H}_4\text{O}_2$) reacts with Na-metal to form a compound R and evolves a gas which burns with a pop sound. Compound C on treatment with an alcohol A in presence of an acid forms a sweet smelling compound S (molecular formula, $\text{C}_3\text{H}_6\text{O}_2$). On addition of NaOH to C, it also gives R and water. S on treatment with NaOH solution gives back R and A. Identify C, R, A, S and write down the reactions involved .
- Q6.** Esters are sweet-smelling substances and are used in making perfumes. Suggest some activity and the reaction involved for the preparation of an ester with well labeled diagram.
- Q7.** (a) Write the formula and draw electron dot structure of carbon tetrachloride.
(b) What is saponification? Write the reaction involved in this process.
- Q8.** Name the reaction which is commonly used in the conversion of vegetable oils to fats. Explain the reaction involved in detail.
- Q9.** (a) What are hydrocarbons? Give examples.
(b) Give the structural differences between saturated and unsaturated hydrocarbons with two examples each.
(c) What is a functional group? Give examples of four different functional groups.

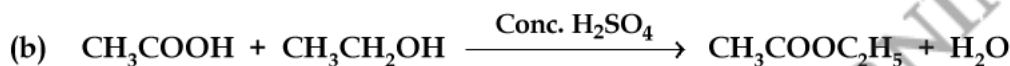
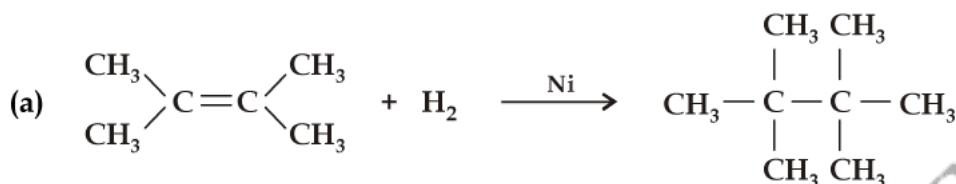
Q10. Look at figure and answer the following questions



- What change would you observe in the calcium hydroxide solution taken in tube B?
- Write the reaction involved in test tubes A and B respectively.
- If ethanol is given instead of ethanoic acid, would you expect the same change?
- How can a solution of lime water be prepared in the laboratory?

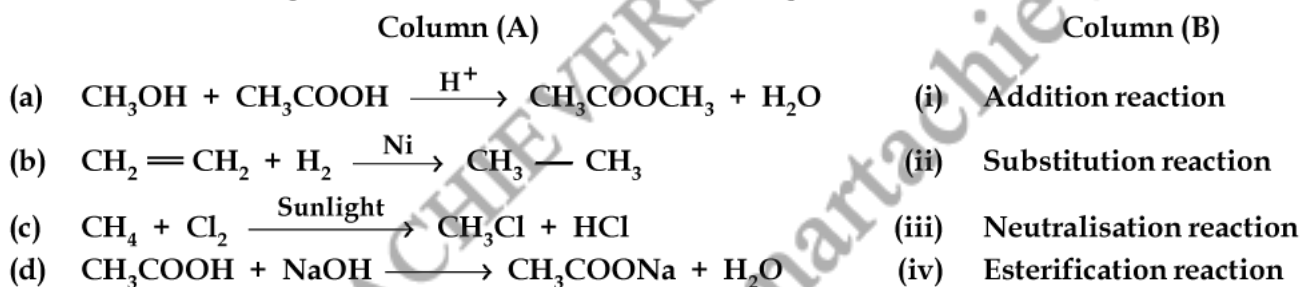
Q11. A salt X is formed and a gas is evolved when ethanoic acid reacts with sodium hydrogencarbonate. Name the salt X and the gas evolved. Describe an activity and draw the diagram of the apparatus to prove that the evolved gas is the one which you have named. Also, write chemical equation of the reaction involved.

Q12. What is the role of metal or reagents written on arrows in the given chemical reactions?



Q13. Write the structural formulae of all the isomers of hexane.

Q14. Match the reactions given in column (A) with the names given in column (B)



Q15. Unsaturated hydrocarbons contain multiple bonds between the two C-atoms and show addition reactions. Give the test to distinguish ethane from ethene.

Q16. Catenation is the ability of an atom to form bonds with other atoms of the same element. It is exhibited by both carbon and silicon. Compare the ability of catenation of the two elements. Give reasons.

Q17. In electron dot structure, the valence shell electrons are represented by crosses or dots.

- The atomic number of chlorine is 17. Write its electronic configuration.
- Draw the electron dot structure of chlorine molecule.

Q18. Carbon, Group (14) element in the Periodic Table, is known to form compounds with many elements. Write an example of a compound formed with

- chlorine (Group 17 of Periodic Table)
- oxygen (Group 16 of Periodic Table)

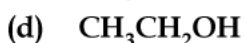
Q19. Ethane is formed when ethanol at 443 K is heated with excess of concentrated sulphuric acid. What is the role of sulphuric acid in this reaction? Write the balanced chemical equation of this reaction.

Q20. A gas is evolved when ethanol reacts with sodium. Name the gas evolved and also write the balanced chemical equation of the reaction involved.

Q21. Intake of small quantity of methanol can be lethal. Comment.

Q22. How is ethene prepared from ethanol? Give the reaction involved in it.

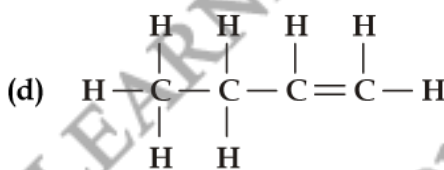
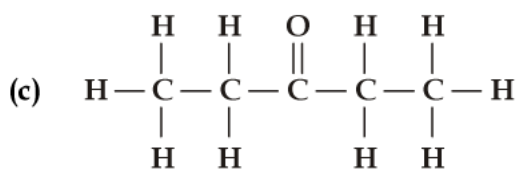
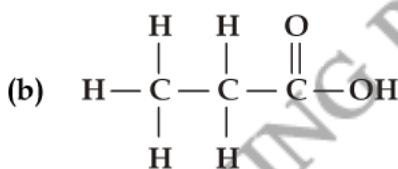
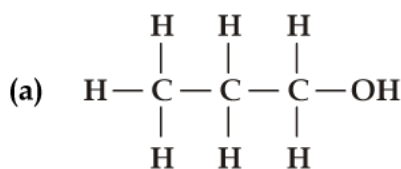
Q23. Name the functional groups present in the following compounds



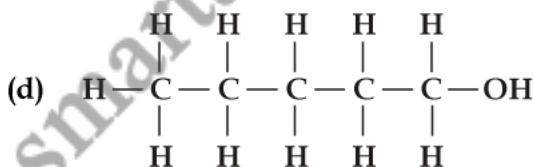
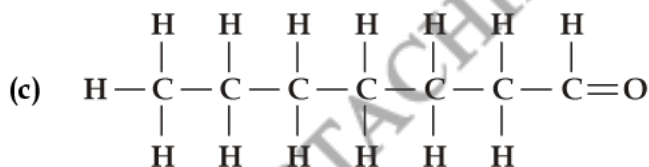
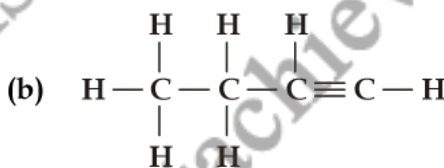
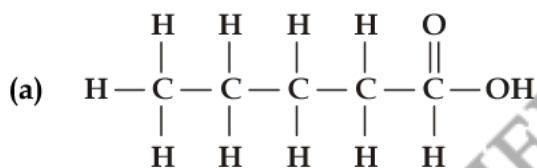
Q24. Why detergents are better cleansing agents than soaps? Explain.

Q25. A compound X is formed by the reaction of a carboxylic acid $\text{C}_2\text{H}_4\text{O}_2$ and an alcohol in presence of a few drops of H_2SO_4 . The alcohol on oxidation with alkaline KMnO_4 followed by acidification gives the same carboxylic acid as used in this reaction. Give the names and structures of (a) carboxylic acid, (b) alcohol and (c) the compound X. Also write the reaction.

Q26. Identify and name the functional groups present in the following compounds.

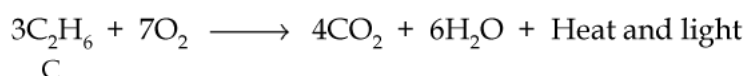
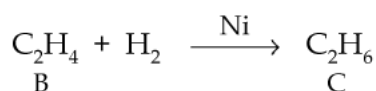
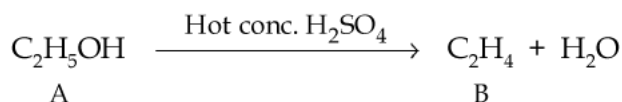


Q27. Write the names of the following compounds

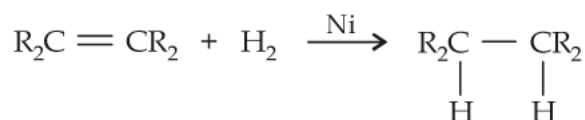


Q28. Draw the electron dot structure of ethyne and also draw its structural formula.

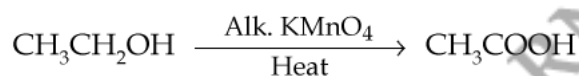
- S1.** Since compound C gives 2 moles of CO_2 and 3 moles of H_2O , it shows that it has the molecular formula C_2H_6 (Ethane). C is obtained by the addition of one mole of hydrogen to compound B so the molecular formula of B should be C_2H_4 (Ethene). Compound B is obtained by heating compound A with concentrated H_2SO_4 which shows it to be an alcohol. So compound A could be $\text{C}_2\text{H}_5\text{OH}$ (Ethanol)



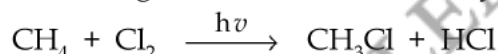
- S2. Hint:** (a) Unsaturated hydrocarbons add hydrogen in the presence of nickel catalyst to give saturated hydrocarbons.



- (b) Ethanol is oxidised to ethanoic acid in the presence of alkaline KMnO_4 on heating.



- (c) In the presence of sunlight, chlorine is added to hydrocarbons.

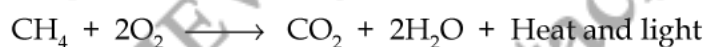


- (d) $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \longrightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$

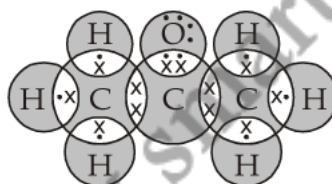
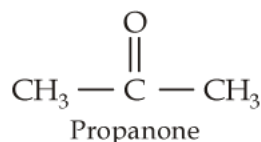
Ester

Used in the preparation of soap.

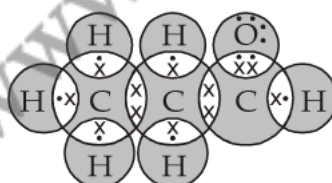
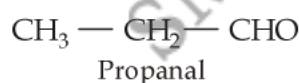
- (e) Most carbon compounds release a large amount of heat and light on burning



S3.

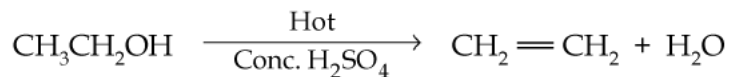


Electron dot structure of propanone



Electron dot structure of propanal

S4. (a) **Hint:** (a) By the dehydration of ethanol in the presence of concentrated H_2SO_4 .



(b) By the oxidation of propanol using oxidising agent such as alkaline KMnO_4 .

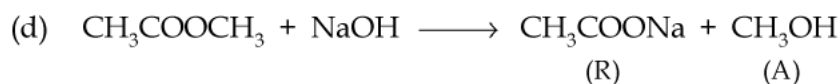
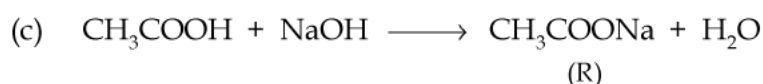
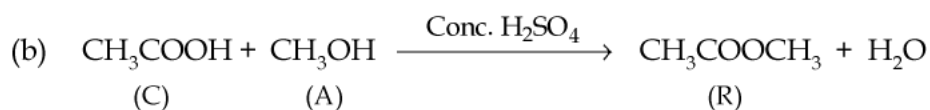
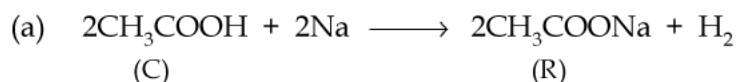


S5. C – Ethanoic acid

R – Sodium salt of ethanoic acid (sodium acetate) and gas evolved is hydrogen

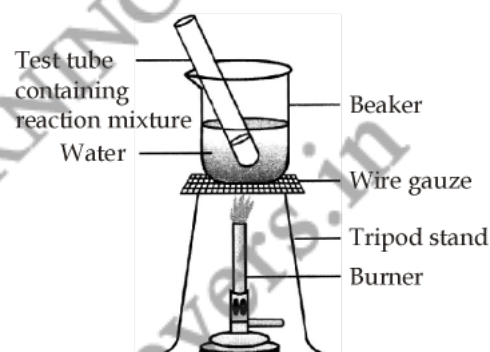
A – Methanol

S – Ester (Methyl acetate)



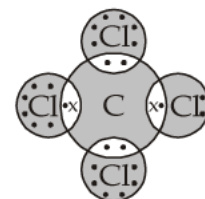
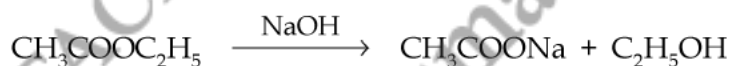
S6. **Activity:**

- Take 1 mL ethanol (absolute alcohol) and 1 mL glacial acetic acid along with a few drops of concentrated sulphuric acid in a test tube.
- Warm in a water-bath at about 60°C for a least be heated directly on flame as the vapours of ethanol catch fire)
- Pour into a beaker containing 20-50 mL of water and smell the resulting mixture.

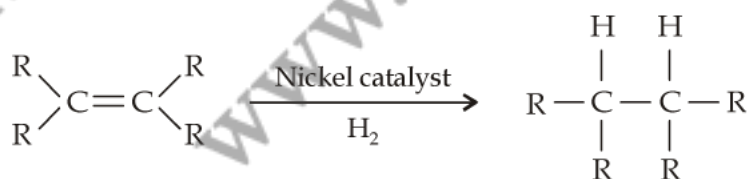


S7. (a) CCl_4

(b) Saponification is the process of converting esters into salts of carboxylic acids and ethanol by treating them with a base.

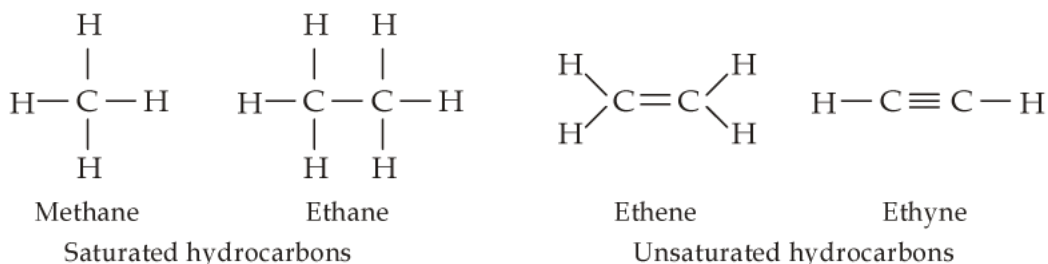


S8. **Hint:** Hydrogenation reaction



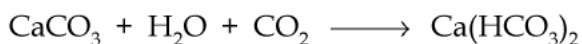
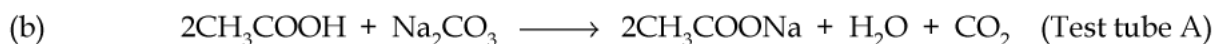
- S9.** (a) Compound of carbon and hydrogen are called hydrocarbons. Example, methane, ethane etc.
 (b) Saturated hydrocarbons contain carbon-carbon single bonds.

Unsaturated hydrocarbons contain at least one carbon-carbon double or triple bond.

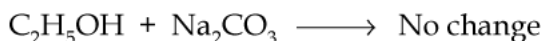


- (c) Functional group - An atom/group of atoms joined in a specific manner which is responsible for the characteristic chemical properties of the organic compounds. Examples are hydroxyl group ($-\text{OH}$), aldehyde group ($-\text{CHO}$), carboxylic group ($-\text{COOH}$) etc.

- S10.** (a) It will turn milky



- (c) As $\text{C}_2\text{H}_5\text{OH}$ and Na_2CO_3 do not react, a similar change is not expected



- (d) The lime water is prepared by dissolving calcium oxide in water and decanting the supernatant liquid.

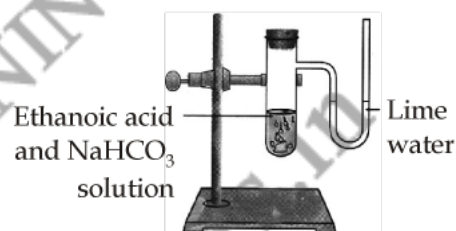


X is sodium ethanoate

Gas evolved is carbon dioxide

Hint: Activity

Lime water will turn milky, a characteristic property of CO_2 gas.

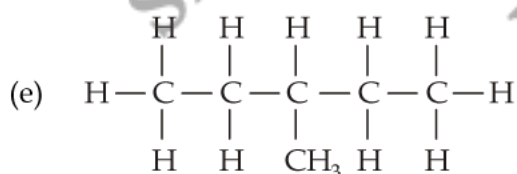
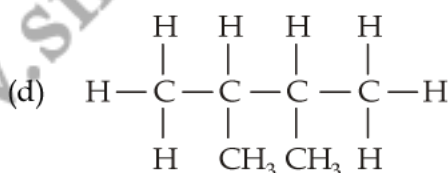
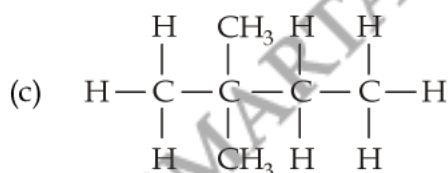
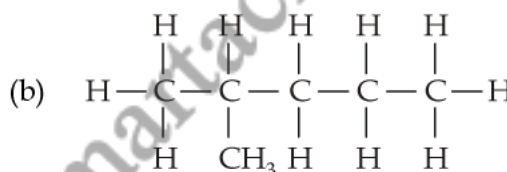
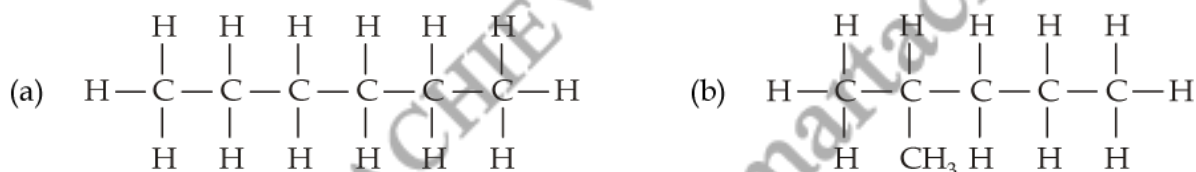


- S12. Hint:** (a) Ni acts as a catalyst.

(b) Concentrated H_2SO_4 acts as a catalyst.

(c) Alkline KMnO_4 acts as an oxidising agent.

S13.



- S14.** (a) - (iv) (b) - (i) (c) - (ii) (d) - (iii)

S15. Hint: The two can be distinguished by subjecting them to the flame. Saturated hydrocarbons generally give a clear flame while unsaturated hydrocarbons give a yellow flame with lots of black smoke.

S16. Carbon exhibits catenation much more than silicon or any other element due to its smaller size which makes the C — C bonds strong while the Si — Si bonds are comparatively weaker due to its large size.

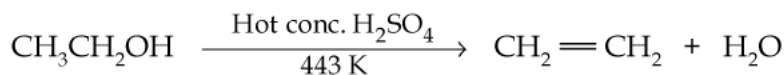
S17. (a) K, L, M
2, 8, 7



S18. (a) Carbon tetrachloride (CCl₄)

(b) Carbon dioxide (CO₂)

S19. Sulphuric acid acts as a dehydrating agent.

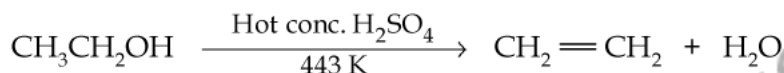


S20. Gas evolved is hydrogen.



S21. Methanol is oxidised to methanal in the liver. Methanal reacts rapidly with the components of cells. It causes the protoplasm to coagulate. It also affects the optic nerve, causing blindness.

S22. Ethanol on heating with excess concentrated sulphuric acid at 443 K results in the dehydration of ethanol to give ethene.



S23. (a) Ketone

(b) Carboxylic acid

(c) Aldehyde

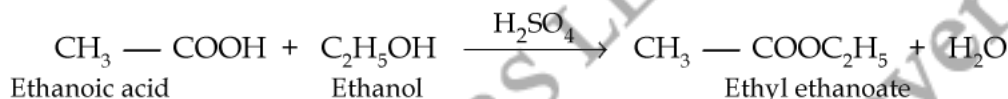
(d) Alcohol

S24. Detergents work as cleansing agent both in hard and soft water. The charged ends of detergents do not form insoluble precipitates with calcium and magnesium ions in hard water.

S25. (a) Carboxylic acid is ethanoic acid

(b) Alcohol is ethanol

(c) X is ethyl ethanoate



S26. (a) — OH Hydroxyl/Alcohol

(b) Carboxylic acid

(c) Ketone

(d) Alkene

S27. (a) Pentanoic acid

(b) Butyne

(c) Heptanal

(d) Pentanol

S28. H : C :: C : H Electron dot structure of ethyne (C₂H₂)

H — C ≡ C — H Structural formula of ethyne