PRACTICE EXERCISE 5.1

Q1. Name the element whose one of the allotropic forms is Buckminster-fullerene.

Q2. What are the two properties of carbon which lead to the formation of a large number of carbon compounds?

Q3. State whether the following statement is true or false:

Diamond and graphite are the covalent compounds of carbon element (C).

Q4. Name the element whose allotropic form is graphite.

Q5. Buckminsterfullerene is a spherical molecule in which 60 carbon atoms are arranged in interlocking hexagonal and pentagonal rings of carbon atoms.

(a) How many hexagons of carbon atoms are present in one molecule of Buckminster-fullerene?

(b) How many pentagons of carbon atoms are present in one molecule of Buckminster-fullerene?

Q6. Name the black substance of pencil. Will the current flow through the electrical circuit when we use the sharpened ends of the pencil to complete the circuit?

Q7. How does graphite act as a lubricant?

Q8. Which of the following molecule is called buckminsterfullerene?

C_{90} C_{60} C_{70} C_{120}

Q9. Give the name and structural formula of an alkyl group.

Q10. Write the electron-dot structures for: (i) Ethane, (ii) Ethene and (iii) ethyne.

Q11. Give the IUPAC name of the following compound:

C_2H_6, C_4H_8, C_5H_8, C_7H_{12}

Q12. Write the structural formula of (i) Propene (ii) Butgne (iii) Hexyne.

Q13. Write the structural formula of (i) Propyne (ii) Butene (iii) Pentane.

Q14. What do you call the compounds having the same molecular formula but different structural arrangements of atoms?

Q15. Write the names of any two isomers represented by the molecular formula C_5H_{12}.

Q16. Write down (i) structural formula, and (ii) electron-dot formula, of any one isomers of hexane (C_6H_{14}), other than *n*-hexane.

Q17. Fill in the following blanks with suitable words:

(a) The form of carbon which is known as black lead is …….

(b) The form of carbon which is used as a lubricant at high temperature is ……..

(c) Compounds of carbon with hydrogen alone are called……..

(d) Ethane and ethyne are examples of ……. hydrocarbons.

(e) Carbon compounds have usually …… melting points and boiling points because they are ….. in nature.

(f) The property of carbon atoms to form long chains in compounds is called……

(g) The general formula C_nH_{2n} for cycloalkanes is the same as that of ……

(h) The IUPAC name of ethylene is ……..

(i) The IUPAC name of acetylene is …….

Q18. What type of chemical bonds are formed by carbon? Why?

Q19. What is the general name of all the compounds made up of carbon and hydrogen?

Q20. Why does carbon form compounds mainly by covalent bonding?

Q21. What is meant by catenation? Name two elements which exhibit the property of catenation.

Q22. Write the names and structural formulae of all the possible isomers of hexane.

Q23. What is buckminsterfullerene? How is it related to diamond and graphite?

Q24. Why is diamond used for making cutting tools (like glass cutters) but graphite is not?

Q25. Why is graphite used for making dry cell electrodes but diamond is not?

PRACTICE EXERCISE 5.2

Q1. Classify the following compounds as alkanes, alkenes and alkynes:

$C_2H_4,\ C_3H_4, C_4H_8,$

Q2. Give the molecular formula of butane and mention the names of its two isomers. Name one fuel which contains both these isomers.

Q3. Give IUPAC names and formulae of an organic compound containing single bonds and the other containing a triple bond.

Q4. Which of the following is the molecular formula of benzene?

$C_6H_6, C_6H_{10}, C_6H_{12}, C_6H_{14}$

Q5. Which of the two has a branched chain: isobutene or normal butane?

Q6. How can diamonds be made artificially? How do synthetic diamonds differ from natural ones?

Q7. Give any two differences between the properties of diamond and graphite. What causes these differences?

Q8. Why does the element carbon from a large number of carbon compounds?

Q9. Write down the structures and names of two isomers of butane (C_4H_{10})

Q10. Give the name and structural formula of one member each of the following:

(i) alkane (ii) alkene (iii) alkyne (iv) cycloalkane

Q11. Give common name of (i) ethyne, and (ii) Ethene.

Q12. Write the molecular formula and structure of benzene.

Q13. What is the unique property of carbon atom? How is this property helpful to us?

Q14. Explain why, diamond is hard while graphite is soft (through both are made of carbon atoms).

Q15. Giving their structure, state the number of single bonds, double bonds and triple bonds (if any) in the following compounds:

(i) ethyne (ii) ethane (iii) benzene

Q16. Write the molecular formula and structure of cyclohexane. How many covalent bonds are there in a molecule of cyclohexane?

Q17. Write two points of difference in the structures of diamond and graphite.

Q18. State one used of diamond which depends on its 'extraordinary brilliance' and one use of graphite which depends on its being 'black and quite soft'.

Q19. What is diamond? Of what substance is diamond made?

Q20. Describe the structure of diamond. Draw a simple diagram to show the arrangement of carbon atoms in diamond.

Q21. Explain why, diamond has a high melting point.

Q22. Satate any two uses of diamond.

Q23. What is graphite? Of what substance is graphite made?

Q24. Describe the structure of graphite with the help of a labeled diagram.

Q25. Why is graphite a good conductor of electricity but diamond is a non-conductor of electricity?

Q26. State any two uses of graphite.

Q27. Explain the term 'isomers'. Give one example of isomers.

Q28. Write (i) structural formula, and (ii) electron-dot structure, of any one isomer of *n*-heptane (C_7H_{16}).

Q29. Write IUPAC name of the compound having the formula $n-C_4H_{10}$.

Q30. What are hydrocarbons? Explain with examples.

Q31. Explain the meaning of saturated and unsaturated hydrocarbons with two examples each.

Q32. Give the names and structural formulae of one saturated cyclic hydrocarbon and one unsaturated cyclic hydrocarbon.

Q33. Give one example of a hydrocarbon, other than pentane, having more than three isomers.

Q34. How many isomers of the following hydrocarbons are possible?

(i) C_3H_8 (ii) C_4H_{10}

(iii) C_5H_{12} (iv) C_6H_{14}

PRACTICE EXERCISE 5.3 (MCQ)

Q1. Out of the following pairs of compounds, the unsaturated compounds are:

(a) C_2H_6 and C_4H_6

(b) C_6H_{12} and C_5H_{12}

(c) C_4H_6 and C_6H_{12}

(d) C_2H_6 and C_4H_{10}

Q2. The number of covalent bonds in pentane (molecular formula C_5H_{12}) is:

(a) 5 (b) 12

(c) 17 (d) 16

Q3. The property of self-combination of the atoms of the same element to form long chains is known as:

(a) protonation (b) carbonation

(c) coronation (d) catenation

Q4. A cyclic hydrocarbon having carbon-carbon single bonds as well as carbon-carbon double bonds in its molecule is:

(a) C_6H_{12} (b) C_6H_{14}

(c) C_6H_6 (d) C_6H_{10}

Q5. The hydrocarbon 2-methylbutane is an isomer of:

(a) n-pentane (b) n-butane

(c) propane (d) iso-butane

Q6. An unsaturated hydrocarbon having a triple covalent bond has 50 hydrogen atoms in its molecule. The number of carbon atoms in its molecule will be:

(a) 24 (b) 25

(c) 26 (d) 28

Q7. An alkyne has seventy five carbon atoms in its molecule. The number of hydrogen atoms in its molecule will be:

(a) 150 (b) 148

(c) 152 (d) 146

Q8. A diamond-toothed saw is usually used for cutting:

(a) steel girders (b) logs of wood

(c) marble slabs (d) asbestos sheets

Q9. The organic compound prepared by Wohler from an inorganic compound called ammonium cyanate was:

(a) glucose (b) graphite

(c) uric acid (d) vinegar

Q10. One of the following is not an allotrope of carbon. This is:

(a) diamond (b) graphite

(c) cumene (d) buckministerfullerene

Q11. The number of carbon atoms in the organic compound named as 2,2-dimethylpropane is:

(a) two (b) five

(c) three (d) four

Q12. The pair of elements which exhibits the property of catenation is:

(a) sodium and silicon

(b) chlorine and carbon

(c) carbon and sodium

(d) silicon and carbon

Q13. A saturated hydrocarbon has fifty hydrogen atoms in its molecule. The number of carbon atoms in its molecule will be:

(a) twenty five (b) twenty four

(c) twenty six (d) twenty seven

Q14. A hydrocarbon having one double bond has 100 carbon atoms in its molecule. The number of hydrogen atoms in its molecule will be:

(a) 200 (b) 198

(c) 202 (d) 196

Q15. The hydrocarbon which has alternate single and double bonds arranged in the form of a ring is:

(a) cyclobutane (b) benzene

(c) butane (d) hexane

Q16. Which of the following cannot exhibit isomerism?

(a) C_4H_{10} (b) C_5H_{12}

(c) C_3H_8 (d) C_6H_{14}

Q17. The pencil leads are made of mainly:

(a) lithium (b) charcoal

(c) lead (d) graphite

PRACTICE EXERCISE 5.4

Q1. The number of isomers formed by the hydrocarbon with molecular formula C_5H_{12} is:

(a) 2 (b) 5

(c) 3 (d) 4

Q2. The number of carbon atoms joined in a spherical molecule of buckminsterfullerene is:

(a) fifty (b) sixty

(c) seventy (d) ninety

Q3. A solid element X has four electrons in the outermost shell of its atom. An allotrope Y of this element is used as a dry lubricant in machinery and also in making pencil leads.

(a) What is element X?

(b) Name the allotrope Y.

(c) State whether allotrope Y is a good conductor or non-conductor of electricity.

(d) Name one use of allotrope Y (other than lubrication and pencil leads).

(e) Name two other allotropes of element X.

Q4. Two organic compounds A and B have the same molecular formula C_6H_{12}. Write the names and structural formulae:

(a) if A is a cyclic compound.

(b) if B is an open chain compound.

(c) Which compound contains single bonds as well as a double bond?

(d) Which compound contains only single bonds?

Q5. The solid element A exhibits the property of catenation. It is also present in the form of a gas B in the air which is utilized by plants in photosynthesis. An allotrope C of this element is used in glass cutters.

(a) What is element A?

(b) What is the gas B?

(c) Name the allotrope C.

(d) State another use of allotrope C (other than in glass cutters).

(e) Name another allotrope of element A which exists as spherical molecules.

(f) Name a yet another allotrope of element A which conducts electricity.

Q5. An element E exists in three allotropic forms A, B and C. In allotrope A, the atoms of element E are joined to form spherical molecules. In allotrope B, each atom of element E is surrounded by three other E atoms to form a sheet like structure. In allotrope C, each atom of element E is surrounded by four other E atoms to form a rigid structure.

(a) Name the element E.

(b) What is allotrope A?

(c) What is allotrope B?

(d) What is allotrope C?

(e) Which allotrope is used in making jewellery?

(f) Which allotrope is used in making anode of a dry cell?

Q6. You are given the following molecular formulae of some hydrocarbons:

C_5H_8; C_7H_{14}; C_6H_6; C_5H_{10}; C_7H_{12}; C_6H_{12}

(a) Which formula represents cyclohexane as well as hexene?

(b) Which formula represents benzene?

(c) Which three formulae represent open chain unsaturated hydrocarbons having double bonds?

(d) Which two formulae represent unsaturated hydrocarbons having triple bonds?

(e) Which three formulae can represent cyclic hydrocarbons?

Q7. Which of the following compounds can have a triple bond C_2H_4, C_3H_4, C_3H_6, C^4H_9, C_3H_6

Q8. Write molecular and structural formula of a cycle hydrocarbon whose molecule contains 8 atoms of carbon.

Q9. What is the molecular formula and structural formula of a cyclic hydrocarbon whose one molecule contains 8 hydrogen atoms?

Q10. Write the molecular formula of: (i) an alkane (ii) an alkene, and (iii) an alkyne, each having 20 carbon atoms.

Q11. Which of the following can have a double bond

C_4H_{10}; C_5H_8; C_5H_{10}, C_3H_6,C_2H_5

PRACTICE EXERCISE 5.5

Q1. Write the molecular formula of ethanol.

Q2. What is the next higher homologue of methanol (CH_3OH)?

Q3. Identify the functional group present in the following compounds and name it according to IUPAC system : CH_3OH, C_2H_5CHO, CH_3COOH, CH_3Cl

$CH_3COC_2H_5$, C_2H_2, C_2H_5Br, C_2H_5COOH

Q4. Give the common name and IUPAC name of the simplest aldehyde.

Q5. What is the common name of methanal?

Q6. Name the simplest ketone.

Q7. What is the common name of propanone?

Q8. Write the IUPAC names of the following

(i) CH_3COCH_3 (ii) $CH_3COCH_2CH_3$

Q9. Writ the name and chemical formula of the simplest organic acid.

Q10. Write the IUPAC names, common names and formulae of the first two members of the homologous series of carboxylic acids.

Q11. What is the common name of (a) methanoic acid, and (b) ethanoic acid?

Q12. Draw the structures for the following compounds:

(a) Ethanoic acid (b) Propanoic acid

Q13. Give the common names and IUPAC names of the following compounds:

(a) $HCOOH$ (b) CH_3COOH

Q14. Give the name and structural formula of one homologue of HCOOH.

Q15. Write the formulae of: (a) methanoic acid, and (b) ethanoic acid.

Q16. What is the common name of methanol?

Q17. What is the difference between two consecutive homologues:

(i) in terms of molecular mass?

(ii) in terms of number and kind of atoms per molecule?

Q18. What type of fuels:

(a) burn with a flame?

(b) burn without a flame?

Q19. State whether the following statement is true or false?

The minimum number of carbon atoms in a ketone molecule is two.

Q20. Fill in the following blanks with suitable words:

(a) The next higher homologue of ethanol is …….

(b) The next homologue of C_2H_5OH is ……

(c) The next higher homologue of ethane is ……..

(d) The functional group present in ethanol is…….

(e) Organic compounds having $-\overset{\overset{O}{\|}}{C}-OH$ functional group are known as……

Q21. The general formula of a homologous series of carbon compounds is C_nH_{2n}. Write the molecular formula of the second and fourth members of the series.

Q22. Write the molecular formula of the third and third and fifth members of homologous series of carbon compounds represented by the general formula. $CnH_{2_n}+1$.

Q23. The molecular formula of a hydrocarbon is $C_{10}H_{18}$. Name its homologous series.

Q24. Select the hydrocarbons which are members of the same homologous series. Give the name of each series.

C_5H_{10}; C_3H_8; C_6H_{10}; C_7H_{12}; C_8H_{16}

Q25. Give the molecular formula of one homologue of each of the following:

(i) C_3H_6 (ii) C_2H_6 (iii) C_2H_2

Q26. What is the difference in the molecular mass of any two adjacent homologues?

Q27. By how many carbon atoms and hydrogen atoms do any two adjacent homologues differ?

Q28. Write the formula of the functional group present in carboxylic acids.

Q29. Name the functional group present in $CH_3-C\equiv CH$.

Q30. Name the functional groups present in the following compounds:

(i) CH_3CHO (ii) CH_3CH_2COOH

(iii) CH_3COCH_3 (iv) $CH_3CH_2CH_2OH$

Q31. Write the IUPAC name and common name of CH_3Cl.

Q32. Draw the structure of chlorobutane.

Q33. Draw the structure for bromopentane. Are structural isomers possible for bromopentane?

Q34. Write the name and formula of an organic compound containing a ketone functional group.

PRACTICE EXERCISE 5.6

Q1. How would you name the following compound?

$CH_3 - CH_2 - Br$

Q2. Which of the following compounds contains a carboxylic acid group?

CH_3OH, CH_3COOH, CH_3CHO,

Q3. Define a homologous series. Give the name and structural formula of one homologue of the following: CH_3OH

Q4. Write the molecular formula of the third member of the homologous series of carbon compounds with general formula $C_nH_{2n+1}OH$.

Q5. Name any two fossil fuels.

Q6. Draw the structures for the following compounds:

(a) Propanone (b) Butanone

Q7. Write the IUPAC names of the following:

(i) $HCHO$ (ii) CH_3CHO

(iii) CH_3CH_2CHO (iv) $CH_3CH_2CH_2CHO$

Q8. Which functional group is likely to be present in an organic compound having the molecular formula $C_4H_{10}O$? Write the formula of the organic compound.3

Q9. Match the formulae in group A with appropriate names from group B:

Group A: CH_3COOH, CH_3CHO, CH_3OH

Group B: Methanol, Ethanal, Ethanoic acid.

Q10. Draw the structure of butanoic acid.

Q11. What is the IUPAC name of acetic acid?

Q12. Which functional group do you think can be present in an organic compound having the molecular formula $C_5H_{10}O_{2?}$ Write the formula of the organic compound.

Q13. Give one example each of the compounds having the following functional groups:

(i) Aldehyde group (ii) Alcohol group

(iii) Carboxylic acid group (iv) Halo group

Q14. What is the molecular formula and structure of the alcohol which can be through to be derived from pentane?

Q15. Write the names of the following functional groups:

(i) $-CHO$ (ii) $-OH$

(iii) $-COOH$ (iv) $>C=O$

(v) $-X$

Q16. What makes the candle flame yellow and luminous?

Q17. State two characteristics of an homologous series.

Q18. The molecular formula of an organic compound is $C_{18}H_{36}$. Name its homologous series.

Q19. Select the hydrocarbons which belong to the same homologous series. Give the name of each series.

CH_4, C_2H_2, C_2H_4, C_2H_6,

C_4H_{10}, C_3H_4, C_3H_6

Q20. What is meant by a functional group? Explain with an example.

Q21. Name the functional group which always occurs in the middle of a carbon chain.

Q22. Draw the structures for the following compounds:

(i) Ethanal (ii) Propanal

(iii) Butanal (iv) Pentanal

Q23. What happens when carbon burns in air? Write the chemical equation of the reaction which takes place.

Q24. Why are coal and petroleum called fossil fuels?

Q25. Explain how coal was formed in the earth.

Q26. Describe how petroleum was formed in the earth.

Q27. Name a fossil fuel other than coal and petroleum.

Q28. The molecular formula of a homologue of butane is:

(a) C_4H_8 (b) C_3H_6

(c) C_4H_6 (d) C_3H_8

Q29. One of the following molecular formula can represent two organic compounds having different functional groups. This molecular formula is:

(a) $C_5H_{12}O$ (b) $C_5H_{10}O$

(c) $C_5H_{10}O_2$ (d) C_5H_{12}

Q30. The number of carbon atoms present in the molecule of fifth member of the homologous series of alkynes is:

(a) four (b) five

(c) six (d) seven

PRACTICE EXERCISE 5.7

Q1. One of the following burns without producing a flame. This:

(a) wood (b) charcoal
(c) LPG (d) candle

Q2. The functional group which always occurs in the middle of a carbon chain is:

(a) alcohol group (b) aldehyde group
(c) carboxyl groups (d) ketone group

Q3. The molecular formulae of some organic compounds are given below. Which of these compounds contains an aldehyde group?

(a) C_3H_8O (b) $C_3H_6O_2$
(c) C_3H_6O (d) C_3H_7Cl

Q4. The organic compounds which are isomeric with one another are:

(a) alcohols and aldehydes
(b) aldehydes and carboxylic acids
(c) ketones and aldehydes
(d) alcohols and ketones

Q5. The fuel which usually burns with a blue flame is:

(a) coal (b) LPG
(c) candle wax (d) kerosene (in lamp)

Q6. Which of the following burns by producing a yellow, luminous flame?

(a) natural gas (b) cake
(c) wax (d) charcoal

Q7. The molecular formula of an organic compounds is $C_{48}H_{94}$. This compound belongs to the homologous series of:

(a) alkenes (b) aldehydes
(c) alkynes (d) alkanes

Q8. One of the following molecular formulae represents a ketone. This formula is:

(a) $C_5H_{12}O$ (b) $C_6H_{12}O_2$
(c) $C_6H_{14}O$ (d) $C_6H_{12}O$

Q9. Which one of the following is not a fossil fuel?

(a) petrol (b) coke
(c) charcoal (d) coal

Q10. Butanone is a four-carbon compound having the functional group:

(a) $-COOH$ (b) $-CHO$
(c) $-CO-$ (d) $-OH$

Q11. The molecular formula of the third member of the homologous series of ketones is:

(a) C_4H_8O (b) C_3H_6O
(c) $C_5H_{10}O$ (d) $C_6H_{12}O$

Q12. The functional group present in propanal is:

(a) $-OH$ (b) $-COOH$
(c) $-CO-$ (d) $-CHO$

Q12. An organic compound having the molecular formula C_3H_6O can exist in the form of two isomers A and B having different functional groups. The isomers A is a liquid which is used as a solvent for nail polish. The isomer B is also a liquid. An aqueous solution of one of the lower homologues of B is used for preserving biological specimens in the laboratory.

(a) What is compound A?
(b) Write the electron-dot structure of A.
(c) What is compound B?
(d) Write the electron-dot structure of B.
(e) Name the lower homologue of compound B which is used in preserving biological specimens.

Q13. A hard material X which is mined from the earth is used as a household fuel and also for the generation of electricity at Thermal Power Stations. A soft material Y is also used as a fuel in the form of candles. A gaseous material Z which occurs alongwith petroleum is increasingly being used as a fuel in running vehicles in its compressed form.

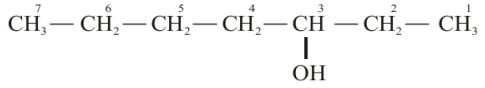
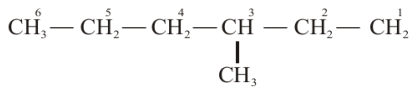
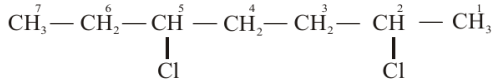
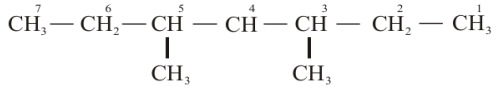
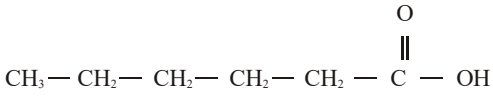
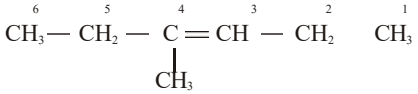
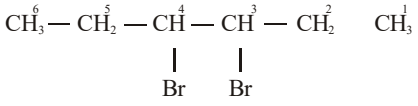
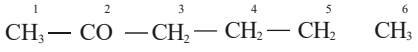
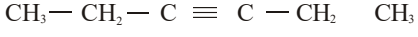
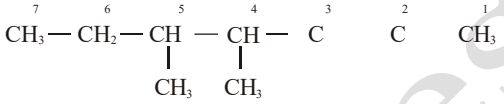
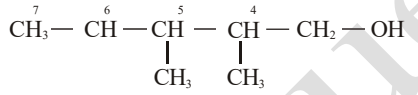
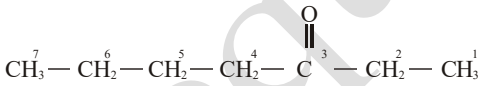
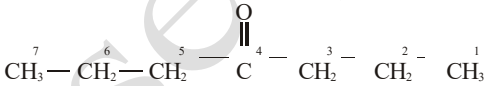
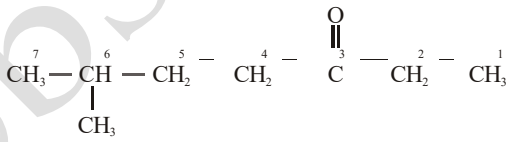
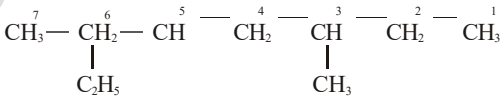
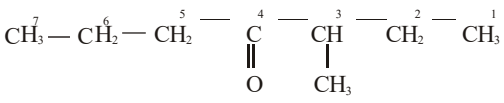
(a) What are materials, X, Y and Z?
(b) When materials X, Y and Z are burned separately:
(i) Which material burns by producing a yellow, luminous flame?
(ii) Which material ultimately burns without producing a flame?
(iii) Which material can burn in a gas stove by producing a blue flame?

Q16. You are given an organic compound having the molecular formula C_3H_8. Give the name and formula of the compound formed:

(a) when one H atom of C_3H_8 is replaced by a C1 atom.
(b) when one H atom of C_3H_8 is replaced by OH group.
(c) when one H atom of C_3H_8 is replaced by a CHO group.
(d) when one H atom of C_3H_8 is replaced by a COOH group.

PRACTICE EXERCISE 5.8

Give IUPAC name of the following compounds.

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 
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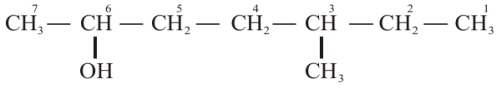
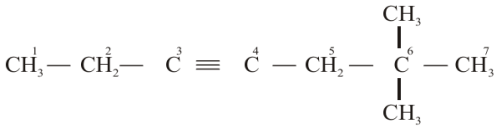
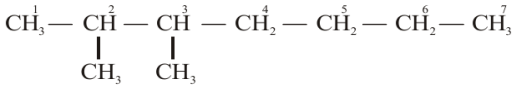
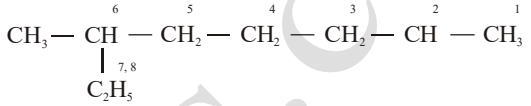
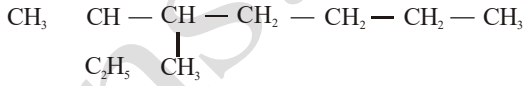
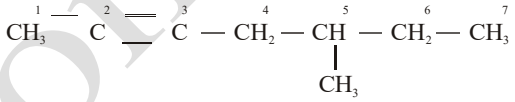
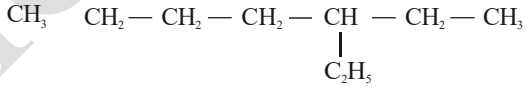
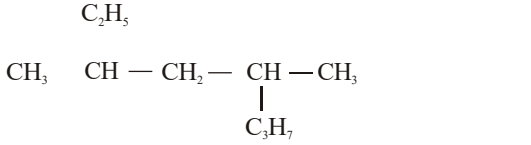
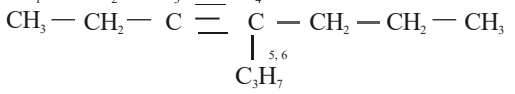
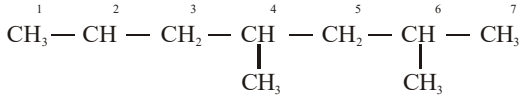
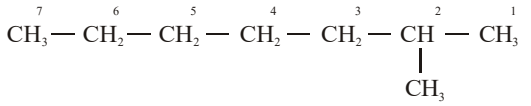
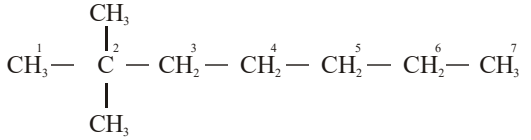
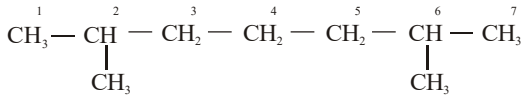
18. 
19. 
20. 
21. 
22. 
23. 
24. 
25. 
26. 
27. 
28. 
29. 
30. 

PRACTICE EXERCISE 5.8

Q1. Name the gass evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?

Q2. Which of the following will give brisk effervescence with sodium hydrogencarbonate and why? CH_3COOH, CH_3CH_2OH

Q3. Name the functional group present in an organic compound which gives brisk effervescence with $NaHCO_3$.

Q4. Name the hydrocarbon formed when ethanol is heated with conc. H_2SO_4 at 170^0C? What is this reaction known as?

Q5. Why does ethyne (acetylene) burn with a sooty flame?

Q6. Name the product formed when hydrogen is added to ethane.

Q7. Explain why, ethane decolourises bromine water whereas ethane does not.

Q8. Name two catalysts which can be used in the hydrogenation of unsaturated compounds.

Q9. State two disadvantages of incomplete combustion.

Q10. What happens when Sodium reacts with ethanol (ethyl alcohol)

Q11. Describe one reaction of ethanol.

Q12. Name one liquid carbon compound which is being used as an additive in petrol in some countries.

Q13. What are the raw materials required for making soap in a laboratory (or at home)?

Q14. Would you be able to check whether water is hard by using a detergent? Why?

Q15. Describe a test for carboxylic acids.

Q16. Why is the conversion of ethanol into ethanoic acid an oxidation reaction?

Q17. Explain why, alkanes are excellent acids.

Q18. Name one chemical compound which can be used to distinguish between ethanol and ethanoic acid.

Q19. Which of the following hydrocarbons will give substitution reactions and why?

CH_4, C_3H_6, C_3H_8, C_4H_6, C_5H_{12}, C_5H_{10}

Q20. Which of the following will give addition reactions and why?

C_4H_{10}, C_2H_6, C_2H_4, CH_4, C_3H_8, C_3H_4

Q21. What happens when propanoic acid is warmed with methanol in the presence of a few drops of concentrated sulphuric acid? Write equation of the reaction involved.

Q22. What change will you observe if you test soap solution with a litmus paper (red and blue)? Give reason for your observation.

Q23. What is meant by denatured alcohol? What is the need to denature alcohol?

Q24. How would you test for an alcohol.

Q25. Give the harmful effects of drinking alcohol.

Q26. Explain why, methanol is much more dangerous to drink than ethanol.

Q27. What would be observed on adding a 5% alkaline potassium permanganate solution drop by drop to some warm ethanol in a test-tube? Write the name of the compound formed during the chemical reaction. Also write chemical equation of the reaction which takes place.

Q28. How would you distinguish experimentally between an alcohol and a carboxylic acid on the basis of a chemical property?

Q29. Name the gas evolved when ethanol reacts with sodium..

Q30. What type of compound is formed when a carboxylic acid reacts with an alcohol in the presence of conc $H_2SO_{4?}$

Q31. What will you observe when dilute ethanoic acid and dilute hydrochloric acid are put on universal indicator paper, one by one? What does it show?

Q32. What substance should be oxidized to prepare $CH_3COOH?$

Q33. What is the physical state of $CH_3COOH?$

Q34. State one advantage of soaps over detergents.

Q35. What happens when ethanol is heated with concentrated sulphuric acid at 170^0C? Write the equation of the reaction which takes place.

Q36. Choose those compounds from the following which can turn blue litmus solution red:

$HCHO$, CH_3COOH, CH_3OH,

Give reasons for your choice.

Q37. Explain the process of preparation of soap in laboratory.

Q38. Why is common salt (sodium chloride) added during the preparation of soap?

PRACTICE EXERCISE 5.9

Q1. What happens when methane (natural gas) burns in air? Write the chemical equation of the reaction involved.

Q2. Give a test that can be used to differentiate chemically between butter and cooking oil.

Q3. Describe, giving equation, a chemical reaction which is characteristic of saturated hydrocarbons (or alkanes).

Q4. What is an oxidizing agent? Name two oxidizing agents agents which can oxide ethanol to ethanoic acid.

Q5. What is detergent? Name one detergent.

Q6. Why have detergents replaced soap as a washing agent?

Q7. How does ethanoic acid react with sodium hydrogencarbonate? Give equation of the reaction which takes place.

Q8. Why are carbons and its compounds used as fuels for most applications?

Q9. What happens when ethanoic acid reacts with sodium hydroxide? Write equation of the reaction involved.

Q10. What happens when vegetable oils are hydrogenated? Name the catalyst used.

Q11. What is the advantage of detergents over soaps for washing clothes? Also state one disadvantage.

Q12. An organic compound X of molecular formula $C_2H_4O_2$ gives brisk effervescence with sodium hydrogencarbonate. Give the name and formula of X.

Q13. A mixture of ethyne (acetylene) and oxygen is burnt for welding. Can you tell why a mixture of ethyne and air is not used?

Q14. Name a chemical reaction which is characteristic of unsaturated hydrocarbons (like alkenes and alkynes).

Q15. What is added to groundnut oil when it is to be converted to vanaspati ghee?

Q16. Which of the two is better for our health: butter or vegetable oil? Why?

Q17. When ethanoic acid reacts with sodium hydrogencarbonate, then a salt X is formed and a gas Y is evolved. Name the salt X and gas Y. Describe an activity with the help of a labeled diagram of the apparatus used to prove that the evolved gas is the one which you have named. Also write the chemical equation of the reaction involved.

Q18. Give any two uses of ethanoic acid.

Q19. Esters are sweet-smelling substances and are used in making perfumes. Describe an activity for the preparation of an ester with the help of a well labeled diagram. Write an equation for the chemical reaction involved in the formation of the ester. Also write the names of all the substances involved in the process of esterification.

Q20. State any two uses of esters.

Q21. Name the reaction which is usually used in the conversion of vegetable oils to fats. Explain the reaction involved in detail. Write a chemical equation to illustrate you answer.

Q22. What is saponification? Write a chemical equation of the reaction involved in this process. Name all the substances which take part in this process and also those which are formed.

Q23. Why does micelle formation take place when soap is added to water? Will a micelle be formed in other solvents like ethanol also?

Q24. What is a soap? Name one soap.

Q25. Describe the structure of a soap molecule with the help of a diagram.

Q26. Explain the cleansing action of soap. Draw diagrams to illustrate you answer.

Q27. An organic acid X is a liquid, which often freezes during winter time in cold countries, having the molecular formula $C_2H_4O_2$. On warming it with methanol in the presence of a new drops of concentrated sulphuric acid, a compound Y with a sweet smell is formed.

(a) Identify X and Y. Also write their formulae showing the functional group present in them.

(b) Write a chemical equation for the reaction involved.

Q28. An organic compound A (molecular formula $C_2H_4O_2$) reacts with Na metal to form a compound B and evolves a gas which burns with a pop sound. Compound A on treatment with an alcohol C in the presence of a little of concentrated sulphuric acid forms a sweet-smelling compound D (molecular formula $C_3H_6O_2$). Compound D on treatment with NaOH solution gives back B and C. Identify A, B, C and D.

PRACTICE EXERCISE 5.10

Q1. (a) An organic compound X of molecular formula $C_2H_4O_2$ gives brisk effervescence with sodium hydrogencarbonate. Give the name and formula of X.

(b) A mixture of ethyne (acetylene) and oxygen is burnt for welding. Can you tell why a mixture of ethyne and air is not used?

(c) Name a chemical reaction which is characteristic of unsaturated hydrocarbons (like alkenes and alkynes).

Q2. (a) When ethanoic acid reacts with sodium hydrogencarbonate, then a salt X is formed and a gas Y is evolved. Name the salt X and gas Y. Describe an activity with the help of a labeled diagram of the apparatus used to prove that the evolved gas is the one which you have named. Also write the chemical equation of the reaction involved.

(b) Give any two uses of ethanoic acid.

Q3. A natural organic compound X of molecular formula C_2H_6O on oxidation with acidified potassium dichromate gives an acidic compound Y. Compound X reacts the Y on warming in the presence of conc. H_2SO_4 to give a sweet smelling substance Z. What are X, Y and Z?

Q4. Consider the following organic compounds:

$HCHO$, C_2H_5OH, C_2H_6,

CH_3COOH, C_2H_5Cl

Choose two compounds which can react in the presence of conc. H_2SO_4 to form an ester. Give the name and formula of the ester formed.

Ans. C_2H_5OH and CH_3COOH; Ethyl ethanoate, $CH_3COOC_2H_5$

Q5. A neutral organic compound is warmed with some ethanoic acid and a little of conc. H_2SO_4. Vapours having sweet smell (fruity smell) are evolved. What type of functional group is present in this organic compound?

Q6. Consider the following organic compounds:

CH_3OH, C_2H_5, CH_3COCH_3, CH_3COOH

C_2H_5COOH, $C_4H_9COOC_2H_5$, CH_4

C_2H_6, CH_3CHO, $HCHO$

Out of the compounds

(a) Which compound is most likely to be sweet-smelling?

(b) Which compound on treatment with conc. H_2SO_4 at 170^0C forms an alkene?

(c) Which compound on repeated chlorination form chloroform?

(d) Which compound is added to alcohol to denature it?

(e) Which compound is a constituent of vinegar?

(f) Which compound is used to sterilize wounds and syringes?

Q7. An organic compound A having the molecular formula C_3H_8O is a liquid at room temperature. The organic liquid A reacts with sodium metal to evolve a gas which burns causing a little explosion. When the organic liquid A is heated with concentrated sulphuric acid at 170^0C, it forms a compound B which decolourises bromine water. The compound B adds on one molecule of hydrogen in the presence of Ni as catalyst to form compound C which gives substitution reactions with chlorine.

(a) What is compound A?

(b) What compound B?

(c) What type of reaction occurs when A is converted into B?

(d) What is compound C?

(e) What type of reaction takes place when B is converted into C?

Q8. What is the difference between combustion and oxidation? Under what conditions, an oxidation reaction can be called as combustion? Illustrate your answer with one example in each case.

Q9. What are heteroatoms? What is their importance?

Q10. Give an example of each of the following:

(a) A carbon compound containing two double bonds.

(b) A molecule in which central atom is linked to three other atoms.

(c) A compound containing both ionic and covalent bonds.

(d) An organic compound which is soluble in water.

(e) A carbon compound which burns with a sooty flame.

Q11. Why should both sodium metal and ethanol be dry when they are made to react?

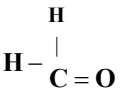
Q12. Two compounds 'X' and 'Y' have the same molecular formula, C_6H_{12}. Compound 'X' is saturated while compound 'Y' is unsaturated. Draw their structures. What type of reaction, compounds 'X' and 'Y' are expected to undergo.

Q13. Three bottles without labels are known to contain ethanol, ethanoic acid and soap solution separately. How will you test which bottle contains which?

PRACTICE EXERCISE 5.11(VIQ)

Q1. Which functional groups are presemt in the familiy of (i) alcohols (ii) aldehydes (iii) carboxylic acids.

Q2. Give the IUPAC name of the compounds

(i) $CH_3 - CH_3 - C\ell$ (ii) 

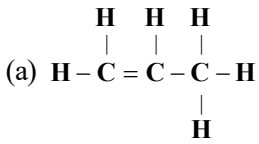
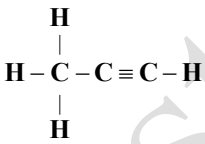
Q3. Name the element whose allotropic form is graphite, diamond, buckministerfullerene.

Q4. What is the difference in the molecular formula of any two consecutive members of a homologous series of organic compounds?

Q5. Name one properties of carbon which is responsible for the existance of a large number of organic compounds.

Q6. Write the name of C_{60}.

Q7. Write the names of the following hydrocarbons:

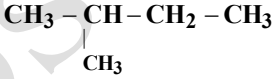
(a)  (b) 

Q8. Name the functional group present in the following compounds

(i) $CH_3CH_2CH_2 - OH$

(ii) $CH_3COCH_2CH_2CH_3$

Q9. Name the compound represented by the formula given below on the basis of IUPAC rule.



Q10. Write the general formula of simple alcohols. Name the first two members of this series.

Q11. Write the molecular formula and the names of the immediate lower and higher homologous of C_4H_6

Q12. Write the molecular formula of the third and the fifth members of the homologus series of carbon compounds represented by C_nH_{2n-2}.

Q13. Name the product formed when ethanol is oxidised using alkaline potassium permanganate.

Q14. The molecular formula of an organic compound is $C_{18}H_{36}$. Name its homologous series.

Q15. A neutral organic compound is warmed with some ethanoic acid and a little of cone. H_2SO_4. Vapours having fruity smell are evolved. What type of functional group is present in this organic compound?

Q16. Write the names of the isomers represented by the molecular formula C_2H_6O.

Q17. How are molecules of aldehydes and ketones structurally different.

Q18. An organic compound X of molecular formula $C_2H_4O_2$ gives brisk effervescence with sodium hydrogen carbonate. Give the name and formula of X.

Q19. Write the molecular formula of the third member of the homologous series repersented by the general formula $C_nH_{2n+1}OH$.

Q20. An organic compound of molecular formula C_2H_6O is used in the constituent of wine and beer. What is the compound?

Q21. An organic compound gives brisk effervescence with sodium hydrogen carbonate? Name the functional group present in it.

Q22. Write the chemical equation representing the preparation of ethanol from ethene.

Q23. Give the structural formula and IUPAC name of formic acid.

Q24. The molecular formula of an ester is $CH_3COOC_2H_5$. Write the molecular formula of the alcohol and the acid from which it can be prepared.

Q25. A soap molecular is made up of two parts: a long hydrocarbon chain and a short ionic end
(a) Which of parts dissolves in water?
(b) Which of parts dissolves in oil?

Q26. Which of the following two compounds belong to the same homologous series
CH_3COOH, CH_3Cl, C_2H_4, C_2H_6O, CH_4O?

Q27. A compound has molecular formula C_2H_6O. It is usable as a fuel. Identity the compound.

Q28. Write the molecular formula of the third and the fifth members of the homolgous series of carbon compounds represented by the general formula $C_nH_{2n}OH$.

Q29. What happens when a piece of sodium is dropped into a test tube containing ethanol?

Q30. Name the product obtained when ethanol is oxidised or alkaline potassium permanganate.

Q31. Name two fatty acids that are present in soap.

Q32. A sweet-smelling substance A is formed when ethanoic acid is warmed with ethanol in the presence of concentrated sulphuric acid. What is the substance A?

Q33. What is detergent?

Q34. Mention one advantage synthetic detergents have over soaps.

Q35. Name the by product of soapnification reaction.

Q36. Name the raw materials required for making soap.

Q37. What type of synthetic detergents are biodegradable?

Q38. What is saponication reaction?

Q39. Give the names of the functional groups:
(i) — CHO (ii) — C = O

Q40. Write the chemical formula of the simplest ketone.

Q41. Alcohol supplied for industrial purposes is mixed with poisonous substance like copper sulphate. why?

Q42. An organic compound burns wilth a sooty flame. It is a saturated or an unsaturated compound?

Q43. Write the structural formula of any one isomers of heptane (C_7H_{16}).

Q44. What is hydrogenation?

Q45. Write the industrial application of hydrogenation.

Q46. An organic compound decolourises acidified potassium permagnate solution. Does this compound contain single, double or triple bond?

Q47. Name the type of hydrocarbons that undergo substitution reactions.

Q48. Define esterification.

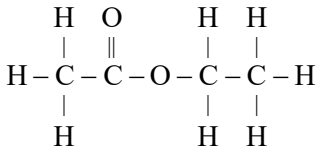
Q49. Two saturated hydrocarbons X and Y have 4 carbon atoms and 6 carbons atoms per molecule respectively. State their physical state at same temperature.

Q50. Write two uses of detergents?

Q51. Write the structural formula for ethene (C_2H_4).

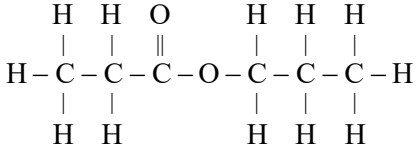
Q52. Which of the following compounds could belong to the same homologous series $C_2H_6O_2$, C_2H_6O, C_2H_6, CH_4O.

Q53. The sturctural formulae of an ester is



Write the molecular formulae of the alcohol and the acid from which it would have been formed.

Q54. The structural formula of an ester is



Write the molecular formulae of the alcohol and the acid from which it would have been formed.

Q55. Which category of compounds is formed when one hydrogen atom of an alkane molecule is replaced by a hydroxyl group? Name the functional groups in the following compounds:

(a) $R-\overset{\overset{O}{\|}}{C}-OH$ (b) $R-\overset{\overset{O}{\|}}{C}-O-R'$

Q56. The boiling points of three saturated hydrocarbons A, B and C are – 162°C, – 42.2°C and – 0.5 °C respectively. Which of these three hydrocarbons would have maximum number of carbon atoms in its molecule.

Q57. In an organic compound, which part largely determines its chemical properties?

Q58. An organic compound (A) on heating wiht acetic acid and conc. sulphuric acid gave a pleasant smelling compound (B). What is the nature of compound (A)?

Q59. Give the IUPAC name of n-propyl alcohol.

Q60. What is fullerenes?

Q61. What is cyclic hydrocarbons.

Q62. Complete the following equation and state the nature of reaction taking place.

$$C_2H_2 + H_2 \xrightarrow[\Delta]{Ni} \rightarrow$$

Q63. Draw the electron-dot sturcture for propane.

Q64. Name one compound each:

(a) containing single covalent bonds.

(b) ionic bonds

Q65. Give the IUPAC name of isopropyl alcohol.

Q66. What is catenation?

Q67. Draw the structures for the following compounds:

(a) Propanone (b) Hexanal

Q68. Give the formula for the following functional groups:

(i) Ketone (ii) Carboxylic acid

Q69. What is a soap?

Q70. Name the alcohol whose consumption can damage optic nerve and cause blindness.

Q71. An organic compound 'A' is a consistuent of wine and beer. This compound, on heating with alkaline potassium permagnate or acidified potassium dichromate, gives another oragnic compound 'B' which turns blue litmus red. Identify the compound 'A'. Write the chemical equations of the reaction that takes place to form compound 'B'. Name the compound 'B'.

Q72. An organic compound A has the molecular formula C_2H_6O. On oxidation it gives carboxylic acid B. On warming with conc. H_2SO_4 the compounds A and B react to form a sweet smelling compound 'C'.

(i) Write the formulae of A, B and C.

(ii) Write the IUPAC names of A and B.

(iii) Write the balanced chemical equation between A and B.

Q73. A sweet smelling compound A with molecular formula $C_4H_8O_2$ on hydrolysis with dil. H_2SO_4 gives two compounds B and C, B on oxidation with $K_2Cr_2O_7/H_2SO_4$ gives C. Identify A, B and C.

Q74. Distinguish between addition and substitution reaction. Give one example of each.

Q75. (a) Give a chemical test to distinguish between saturated and unsaturated hydrocarbons.

(b) (i) Name the product formed when ethanol burns in air.

(ii) Which two forms of energy are liberated on burning alcohol?

(c) Why is the reaction between metbane and chlorine considered a substitution reaction

Q76. How does ethanoic acid react with carboantes and hydrogen carbonates? Write equation sof the reaction involved.

Q77. Complete the following equations and write the names of products formed.

(i) $CH_3COONa + NaOH \xrightarrow{Heat}$

(ii) $C_3H_5OH + O^2 \xrightarrow{Alk.\ KMnO_4}$

(iii) $CH_3COOH + C_2H_5OH \xrightarrow{conc.\ H_2SO_4}$

Q78. Give reason for the following:

(i) Why do unsaturated hydrcarbon show addition reaction?

(ii) Why is the conversion of ethanol to ethanoic acid an oxidation reactance?

(iii) Alcohol supplied for industrial purposes is mixed with copper sulphate.

Q79. Give any two differences in the properties of diamond and graphite.

Q80. Two carbon compouinds A and B have the molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition reaction? Justify your answer. Explain with the help of a chemical equation, how an additional reaction is useful in vegetable ghee industry.

Q81. (a) Complete the following equations:

(i) $CH_3CH_2OH \xrightarrow[Heat]{Conc.\ H_2SO_4}$

(ii) $CH_3COOH + NaHCO_3 \rightarrow$

(iii) $CH_4 + Cl_2 \xrightarrow{sun\ light}$

(b) Write the name of the following:

(i) CH_3CH_2COOH

(ii) CH_3CH_2Br

(c) Draw the electron dot structure of ethane **(C_2H_4).**

Q82. (a) Name the compound CH_3CH_2OH and identify its functional group.

(b) Give a chemical test to distinguish between ethanol and ethanoic acid

(c) Name the product formed when an organic acid reacts with an alcohol in the presence of an acid cathalyst. What is the name assigned to this type of reaction?

Q83. (a) Name the compouind CH_4COOH and identify its functional group.

(b) Give a chemical test to identify this compound.

(c) Name the gas evolved when this compound acts on solid carbonate. How would you identify this gas.

Q84. Write the names of the following functional groups:

(i) $-\overset{O}{\overset{\|}{C}}-$ (ii) —OH

(iii) $-\overset{O}{\overset{\|}{C}}-OH$ (iv) $-\overset{O}{\overset{\|}{C}}-H$

Q85. What happen when:

(i) Ethanol reacts with sodium

(ii) Ethanol is heated at 443K with excess concentrated sulphuric acid

(iii) Ethanoic acid reacts with absolute ethanol in the presence of an acid catalyst.

(iv) Ethyl ethanoate reacts with alkalies.

Q86. (a) A neutral organic compound X of molecular formula C_2H_6O on oxidation with acidified potassium dichromate gives an acidic compound Y. Compound X reacts with Y on warming in the presence of conc. H_2SO_4 to give a sweet smelling substance Z. What are X, Y and Z?

(b) An organic compound 'A' is a constituent of an antifreeze. This compound on heating with oxygen forms another compound 'B' which has a molecular formula $C_2H_4O_2$. Identify the compounds 'A' and 'B'. Write the chemical equation of the reaction that takes place to form the compound 'B'.