CHEMISTRY

BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

CARBON AND ITS COMPOUNDS

Example

1. Give the formulae and IUPAC names of next two members of homologous series given below:

(i)

$C_2H_6, (b)C_2H_4, (c)CH_3OH, (d)HCOOH, (e)CH_3COCH_3$

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2. Write the IUPAC names of the following compounds

(i) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

(ii) $CH_3 - CH = CH - CH_2 - CH_3$

(iii) $CH_3 - \underset{\underset{O}{||}}{C} - CH_2 - CH_3$

(iv) $CH_3 - CH_2 - \underset{\underset{Cl}{|}}{CH} - CH_3$

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3. Give the structure and IUPAC names of straight chain alkanes with molecular formula

(i) $C_4H_{10}, (ii)C_5H_{12}, (iii)C_6H_{14}.$

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4. Starting from the hydrocarbon butane, write the structures and IUPAC names of (i) Chloroderivative(ii) alcohol (iii) aldehyde (iv) carboxylic acid (v) amine (vi) ketone.

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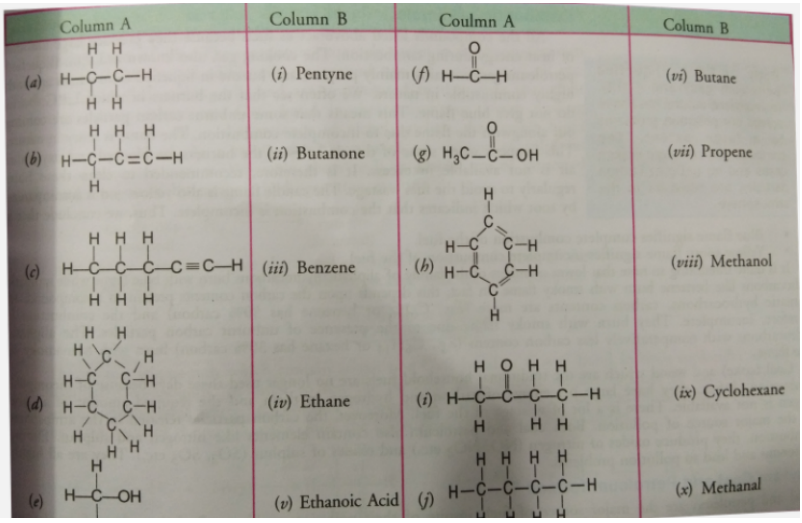
5. Match the structures of compounds given in column A with their IUPAC names in column B.



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6. Write balanced chemical equation for the following

9a) Methane is burnt in sufficient air.

(b) Ethanol is treated with sodium

(c) Ethanoic acid si reated with sodium hydroxide

(d) Ethanoic acid is treated with sodiu carbonate.

(e) Ethanol is mixed with ethanoic acid in the presence of an acid.

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7. An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. The compound reacts with ethanol in presence of an acid to form a sweet smelling

compound 'B'

(a) identify the compound 'A'

(b) Write the chemical equation for its reaction with ethanol to form compound 'B'

(c) How can you get 'A' back from 'B'?

(d) Name the process and write the corresponding chemiacl equation.

(e) Which gas is produced when compound 'A' reacts with washing soda? Write the chemical equation.

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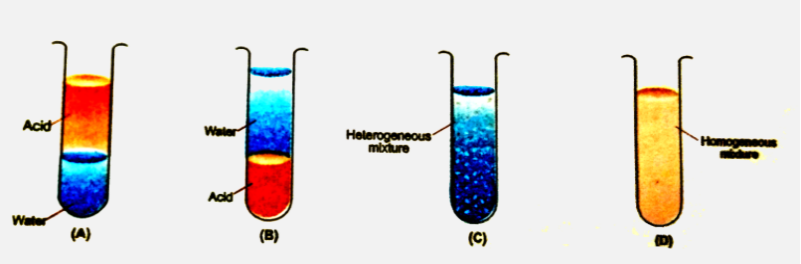
8. About 10 mL water is taken in a test tube. To this nearly 10 mL of acetic aciid are added.

which out of the following will be the correct observation?



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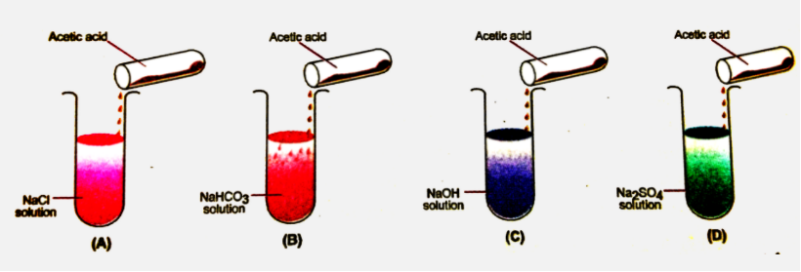
9. In which of the following tubes, effervescence will occur?



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10. A compounds X is fromed by the reaction of a carboxylic acid $C_2H_4O_2$ and an alcohol in the presence of a few drops of H_2SO_4. The alcohol on oxidation with alkalne $KMnO_4$ followed by acidification gives the same carboxylic 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.

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11. A neutral organic compound X of molecualr 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?

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Ncert In Text Problems

1. What would be the electron dot structure of carbon dioxide which has the formula CO_2?

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2. 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.)

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

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4. What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?

A. $catenation$ and $biva \leq nt$

B. $catenation$ and $triva \leq nt$

C. $catenation$ and $tertava \leq nt$

D. $catenation$ and $petnava \leq nt$

Answer: C

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5. What will be the formula and electron dot structure of cyclopentane?

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6. Draw the structures for the following compounds.

(i) Ethanoic acid , (ii) Bromopentane

(iii) Butanone , (iv) Hexanal

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7. How would you name the following compounds?

(i) $CH_3 - CH_2 - Br$

(ii)

$$CH_3 - CH_2 - CH_2 - CH_2 - C \equiv CH, (iii) H - \overset{H}{\underset{|}{C}} = O$$

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8. Why is the conversion of ethanol to ethanoic acid an oxidation reaction?

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

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10. How would you distinguish experimentally between an alcohol and a carboxylic acid?

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11. What are oxidising agents?

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

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13. 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?

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Ncert End Exercise

1. Ethane with the molecular formula C_2H_6 has:

(a) 6 covalent bonds

(b) 7 convalent bonds

(c) 8 covalent bonds

(d) 9 convalent bonds

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2. Butanone is a four-carbon compound with the functional group -

A. Carboxylic acid

B. Aldehyde

C. Ketone

D. Alcohol

Answer: C

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3. While cooking, if the bottom of the vessel is getting blackened on the outside, it means that

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4. Explain the nature of the covalent bond using the bond formation in CH_3Cl.

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5. Draw the electron dot structures for (i) ethanoic acid (ii) H_2S (iii) propanone (iv) F_2.

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6. What is a homologous series ? Explain with an example.

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

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

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9. Why are carbon and its compounds used as fuels for most applications?

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

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

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12. What is hydrogenation? What is its industrial application?

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13. Which of the following hydrocarbons undergo addition reactions: $C_2H_6, C_3H_8, C_3H_6, C_2H_2$ and CH_4.

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

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

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Very Short Answer Question

1. What are the essential constituents of all organic compound?

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2. Name the products obtained by the complete combustion of ethanol. Write the chemical equation as well

$C_2H_5OH(l) + 2O_2(g) \rightarrow 2CO_2(g) + H_2O(l)$

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3. Why are organic compounds present in such a large number?

A. $nonpolarnature$

B. $catenation$

C. $tetrava \leq nt$

D. $cova \leq ntnaturebond \in g$

Answer: B

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4. Which is common in all the members of a family?

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5. A family of organic compounds has the functional group 'al'. What is its name?

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6. Out of ketonic and aldehydic groups, which is the terminal fucntional group?

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7. Why is candle flame generally yellow?

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8. The formula of a hydrocarbon is C_nH_{2n}. Name the family to which it belongs and also predict its nature.

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9. An unknown compound has the smell of vineger. Identiy

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10. What do we get when ethanoic aid reacts with ethanol in the presence of concentrated sulphuric acid?

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11. name the second member of alkyne family. Give its structure.

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12. Vapours of a hydrocarbon were passed through bromine dissolved in carbon tetrachloride. The yelow colour of bromine got discharged? Predict the nature of the hydrocarbon.

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13. Give a test to identify the presence of ethaoic acid.

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14. Out of butter and ground nut oil, which is unsaturated in nature?

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15. What is the role of soap in cleansing of clothes?

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16. Which organic compound is added to make ethanol unfit for drinking purposes? What is the name of the mixture formed?

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

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18. When do you get yellow soot in the burner flame?

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19. Write IUPAC and common names of $CH_3COCH_3, C_2H_5COOH.$

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20. Which of the following belong to the same homologous series?

$C_3H_8, C_4H_8, C_4H_6, C_3H_6.$

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21. Which of the following compounds can have a triple bond?

C_2H_4, C_3H_4, C_3H_6

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22. The molecular formula of butane is C_4H_{10}. What is the formula of butene?

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23. A compound with molecular formula C_2H_6O is used as a fuel. Identify the compound.

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24. What is common in the structures of the compounds methonal and ethanol?

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25. Which functional group are present in the family of (i) alcohols (ii) aldehydes (iii) carboxylic acids?

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26. Identify from thhe following the hydrocarbons that undergo addition reaction:

$C_3H_4, C_2H_6, CH_4, C_2H_4$. Justify your answer.

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27. Which element exhibits the property of catenation to maximum and why?

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28. Select the saturated hydrocarbons from the following

$C_3H_6, C_5H_{10}, C_4H_{10}, C_6H_{14}, C_2H_4$

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29. Write the molecular formula of the first two members of the homologous series having functional group $> C = O$.

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30. Name the functional group present in the compound $CH_3CH_2CH_2COOH$.

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31. Write the next higher homologue of the following:

(i) C_3H_6

(ii) C_5H_8

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32. Name the simplest ketone.

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33. Write full form of CFC.

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34. Write the structure of ethyl alcohol (C_2H_5OH).

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35. Write the formula and name of next homologue of $CH_3CH = CH_2$

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36. Write the structural formula of hexanal.

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37. How many covalent bonds are present in the molecule of ethane?

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38. Draw the structure of a molecule of butanone.

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39. Draw electron dot structures of (i) C_2H_4 (ii) C_2H_5OH.

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40. Write the next homologue of propanol $(CH_3CH_2CH_2OH)$ and Butanal $(CH_3CH_2CH_2CHO)$

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41. What is esterification reaction? Write chemical equation for the reaction of an ester with a base.

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42. how do the melting and boiling points o the hydrocarbons change with increase in molecular mass?

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43. Draw the structure of an unsaturated cyclic compound having six carbon atoms. Also draw its electron dot structure.

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44. Why do alkanes burn with blue flame?

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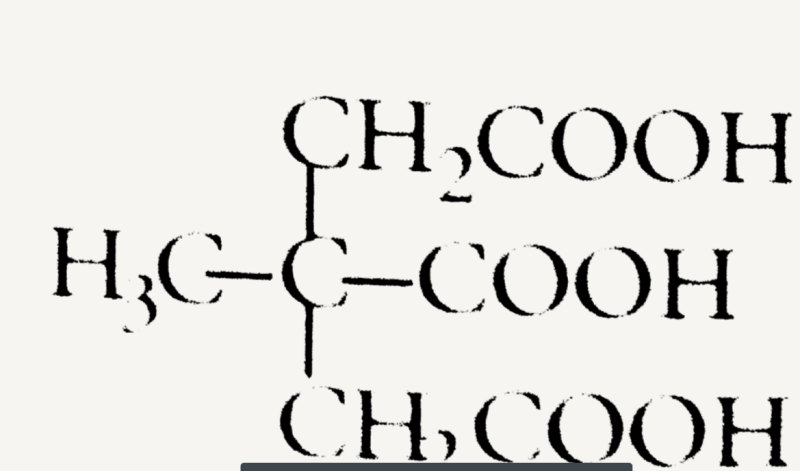
45. The formula of citric acid is shown. State the name of $-COOH$ functional group in citric acid



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46. Give the formula and name of the alkane which contains four carbon atoms in the molecule.

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47. Give the electron dot structure of chloromethane. Also write the formula and the name of the next homologue of it.

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48. Write the name and molecular formula of the fourth member of alkane series.

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49. An alehye as well as a ketone can be represented by the same molecular formula, say C_3H_6O. Write their structures and name them. State the relation between the two in the language of science.

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50. Write the molecular formulae of: CH_3Br and C_2H_5Br.

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51. Why are organic compounds present in such a large number?

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52. The fundamental group 'al'is present in the family of an organic compound. What is its name?

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53. Why is candle flame generally yellow?

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54. Which organic compound is added to make ethanol unfit for drinking purposes? What is the name of the mixture formed?

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55. Write the formula and name of next homologue of CH_3COCH_3.

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56. How many single and double bonds are present in the molecule of benzene (C_6H_6)?

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57. Draw electron dot structures of (i) C_2H_4 (ii) C_2H_5OH.

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58. how do the melting and boiling points o the hydrocarbons change with increase in molecular mass?

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59. Write a chemical test to distinguish between ethanol ad ethanoic acid.

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60. How will you convert ethanol to ethene? Write chemical equation

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61. How do alkanesand alkenes differ in structures? Illustrate your answer.

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62. Which of the following belong to the same homologous series?

$C_3H_8, C_4H_8, C_4H_6, C_3H_6.$

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63. Which element exhibits the property of catenation to maximum and why?

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64. Give a simple test to distinguish soaps from detergents.

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65. What happens when (given chemical equation):

Sodium reacts with ethanol (ethyl alcohol)

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Short Answer Questions

1. How will you name the following compounds?

(a) $CH_3 - \overset{H}{\underset{|}{C}} = O$

(b) $CH_3 - CH_2 - OH$

(c). $H - \overset{H}{\underset{|}{C}} = O$

(d) $CH_3 - CH_2 = Cl.$

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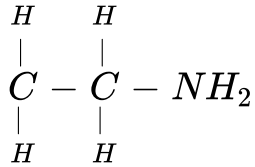
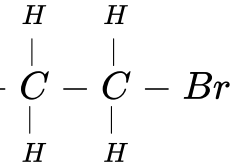
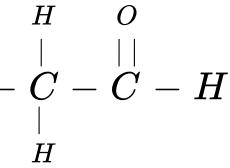
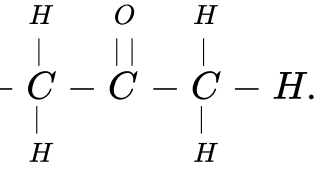
2. Identify the name of the functional group in the following compounds:

(i) 

(ii) 

(iii) 

(iv)  .

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3. Give the electron dot structure and structural formula of first member of alkene and alkyne familes.

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4. Draw the structural formulae of the possible isomers for the compound with molecular formula C_3H_6O?

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5. How will you convert ethane into ethanol? Give the chemical reaction involved.

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6. What is an homologous series? Which two of the following organic compounds belong to te same homologous series?

$C_2H_6, C_2H_6O, C_2H_6O_2, CH_4O$

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7. State two characteristic features of carbon which when put together give rise to a large number of carbon compounds.

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8. Why is petrol regarded as a better fuel than kerosene?

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9. (i) Take about 3 mL, of ethanol is a rest tube and warm it gently in a water bath.

(ii) Add a 5% solution of alkaline potassium permanganate drop by drop to the solution.

(iii) What happens to the colour of $KMnO_4$ added initially and then in excess? Give reason. Name the product of this reaction.

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10. Give the names of the following:

(i) An aldehyde derived from methane.

(ii) ketone derived from butane

(iii) The compound obtained by the oxidatino of ethanol with chroic anhydride.

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11. Write chemical equations for the reactions of ethanoic acid with:

(i) sodium, (ii) sodium carbonate.

(iii) ethanol in the presence for conc. H_2SO_4.

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12. A compound 'X' has the molecular formula C_3H_6O with structural formula CH_3CH_2CHO. Give its IUPAC name. Can another compound have the same molecular formula? Give the structure annd IUPAC name of that compound also?

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13. An organic compound 'X' has the molecular formula $C_2H_4O_2$. It has a pleasant smell. It does not turn blue litmus red nor does it give any effervescence with sodium hydrogen

carbonate solution. Predict the compound. Give its structural formula as well as IUPAC name.

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14. Acetic acid was added to a solid 'X' kept in a test tube. A colourless and odourless gas was evolved. The gas turned lime water milky when passed through it. Predict the nature of the solid.

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15. An organic compound A is a constituent of antifreeze and has the molecular formula C_2H_6O. Upon reaction with alkaline $KMnO_4$, the compound A is oxidised to another

compound B with formula $C_2H_6O_2$. Identify the compounds A and B.

A. benzene, butanone

B. Ethanol, Ethanoic acid

C. ethanoic acid, pentanone

D. butanal, methane

Answer: B

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

(i) $CH_3 - CH_2 - CH_2 - OH$

(ii) $CH_3 - CH_2 - CH_2 - COOH$

(iii) $CH_3 - CH_2 - CHO$

(iv) $CH_3 - CO - CH_2 - CH_3$

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17. (a) Draw the structure of the following compounds:

(i) Ethanoic acid

(ii) Butanone.

(b) why is conversion of ethanol to ethanoic acid considered an oxidation reaction?

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18. (a) What are esters? How are they formed? (b) Write two uses of esters?

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19. Write the names and molecular formula of two organic compounds having functional group suffixed as '-oic acid' with the help of a balanced equations, exaplain what happens when any of them reacts with sodium hydroxide.

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20. Write the name and molecular formula of an organic compound having its name suffixed with '-ol' and having two carbon atoms in the molecule. With the help of a balanced chemical equation indicate what happens when it is heated with excess of conc. H_2SO_4.

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21. A neutral organic compound A of molecular formula C_2H_6O on heating with excess of conc. H_2SO_4 gives compound B of molecular formula C_2H_4. Compound B on reduction gives compound C of molecular formula C_2H_6.

(a) Name A, B and C.

(b) Write chemical equation for the conversion of A to B.

(c) What is the role of conc H_2SO_4 in the above equation.

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22. Give reasons for the following:

(a) Unsaturated hydrocarbons show addition reactions but not saturated hydrocarbons.

(b) Carbon forms only covalent bonds.

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23. Complete the following reactions stating the main products formed in each.

(i) $CH_3 - CH = CH_2 + H_2 \xrightarrow{\text{Ni-catalyst}}$

(ii) $C_2H_5OH + Na \rightarrow$

(iii) $CH_3COOH + Na_2CO_3 \rightarrow$

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24. (a) On dropping a small piece of sodium in an organic compound 'A' with molecular formula C_2H_6O in a test tube, a brisk effervescence is observed. On bringing a burning splinter, the gas evolved burns with a pop sound. Identify 'A' and write the chemical equation.

(b) What will happen when you heat the organic compound 'A' at 443 K with excess of concentrated sulphuric acid?

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25. Write chemical equation to represent each of the following types of reactions of organic substances.

(i) Esterification,

(ii) Saponification

(iii) Substitution.

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26. Out of HCl and CH_3COOH, which one is a weaker acid and why? Describe an activity to support your answer.

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27. What is meant by "the hydrogenation of vegetable oils"? Write the chemical reactions involved in the process. State differences between oils and fats.

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28. How would you distinguish experimentally between ethanol ad ethanoic acid with the help o sodium hydrogen carbonate? Write chemical equation for the reaction involved.

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29. (a) What are covalent bonds? Write the type of bonds present in N_2 and CH_4 molecules.

(b) Why does carbon form compounds mainly by covalent bonding?

(c) Write the IUPAC names of the following compounds?

(i) C_6H_6, $(ii) C_3H_7Cl$.

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30. (a) Write chemcial name and formula of vinegar?

(b) Desbribe with a chemical equation what happens when sodium reacts with ethanol.

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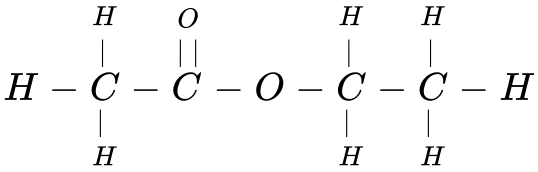
31. The structural formula of an ester is:



Write the structural formula of the corresponding alcohol and acid.

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32. Distinguish between esterification and saponification reactions of organic compounds with the help of the chemical equation for each. Write one use of (i) esters and (ii) saponification process?

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33. An organic compound 'X' on heating with conc. H_2SO_4 forms a compound 'Y' which on addition of one molecule ofhydrogen in the presence of nickel forms a compound 'Z'. One molecule of compound 'Z' on combustion forms two molecules of CO_2 and three molecules of H_2O. Identify, giving reasons the compounds X,Y and Z. write the chemical equations for the reactions involved.

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34. Why are homologous series of carbon compounds so called? Write chemical formula of two consecutive members of a homologous series and stte the part of these compounds that determines their (i) physical properties, and (ii) chemical properties.

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35. A compound 'X' is formed by the reaction of carboxylic acid $C_2H_2O_4$ and an alcohol in the presence of conc. H_2SO_4. This alcohol on treating with alkaline $KMnO_4$ gives the sae carboxylic acid used in the reaction. Give the name structure of carboxylic acid and alcohol. Write the reaction involving formation of 'X'.

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36. name two other elements apart from carbon ad hydrogen which are present in coal and petroleum. Write the chemical reaction when the combustion of these elements takes place on burning coal.

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37. Explain formation of covalent bond by the electron structure of hydrogen, oxygen and nitrogen molecules.

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38. Explain why cannot we have isomers of first three members of alkane family.

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39. Define a homologous series of carbon compounds.

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40. An organic compound 'P' is a constituent of wine. 'P' on reacting with acidified $K_2Cr_2O_7$ forms another compound 'Q'. When a piece of sodium is added to 'Q' a gas 'R' evolves which burns with a pop sound. Identify P,Q and R and write the chemical equations for the reactiono involved.

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41. (a) Define the term functional group. Identify the functional group present in

(i) $H-\overset{\overset{O}{||}}{C}-H$

(ii) $H-\overset{\overset{H}{|}}{\underset{\underset{H}{|}}{C}}-\overset{\overset{OH}{|}}{C}=O$

(b) What happens when 5% alkaline $KMnO_4$ solution is

added drop by drop to warm ethanol taken in a test tube? State the role of alkaline $KMnO_4$ solution in this reaction.

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42. What are covalent compounds ? Why are they different from ionic compounds ? List their characteristic properties .

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43. An aldehye as well as a ketone can be represented by the same molecular formula, say C_3H_6O. Write their structures and name them. State the relation between the two in the language of science.

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44. An organic compound 'X' on heating with conc. H_2SO_4 forms a compound 'Y' which on addition of one molecule ofhydrogen in the presence of nickel forms a compound 'Z'. One molecule of compound 'Z' on combustion forms two molecules of CO_2 and three molecules of H_2O. Identify, giving reasons the compounds X,Y and Z. write the chemical equations for the reactions involved.

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45. Two carbon compound X and Y have the molecular formula C_3H_6 and C_4H_{10} respectively which one is most likely to show addition reaction? Justify your answer, also give the chemical equation to explain the process of addition reaction in this case.

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46. Compare the structures of benzene and cyclohexane by drawing them.

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47. You are given ball and stick model of six carbon atoms and fourteen hydrogen atoms and sufficient number of sticks. In how many ways one can join the models of six carbon atoms and fourteen hydrogen atoms to form different molecules of C_6H_{14}?

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48. A compound 'X' on heating with excess conc. Sulphuric acid at 443K gives an unsaturated compound 'Y'. 'X' also reacts with sodium metal to evolve a colourless gas 'Z'. Identify 'X', 'Y' and 'Z'. Write the equation of the chemical reaction of formation of 'Y' and also write the role of sulphuric acic in the reaction.

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49. (a) Why are most carbon compounds poor conductors of electricity?

(b) Write the name and structure of a saturated compouund in which the carbon atoms are arranged in a ring. Give the number of single bonds present in this compound.

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50. Explain the cleansing action of soaps.

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51. Why is petrol regarded as a better fuel than kerosene?

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52. An aldehye as well as a ketone can be represented by the same molecular formula, say C_3H_6O. Write their structures and name them. State the relation between the two in the language of science.

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53. Give the names of the following:

(i) An aldehyde derived from methane.

(ii) ketone derived from butane

(iii) The compound obtained by the oxidation of ethanol with chromic anhydride.

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54. Write the structural formulae and IUPAC names of the isomers represented by C_5H_{12}.

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55. Acetic acid was added to a solid 'X' kept in a test tube. A colourless and odourless gas was evolved. The gas turned

lime water milky when passed through it. Predict the nature of the solid.

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56. (a) Draw the structure of the following compounds:

(i) Ethanoic acid

(ii) Butanone.

(b) why is conversion of ethanol to ethanoic acid considered an oxidation reaction?

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57. Write the name and molecular formula of an organic compound having its name suffixed with '-ol' and having two carbon atoms in the molecule. With the help of a balanced

chemical equation indicate what happens when it is heated with excess of conc. H_2SO_4.

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58. A neutral organic compound A of molecular formula C_2H_6O on heating with excess of conc. H_2SO_4 gives compound B of molecular formula C_2H_4. Compound B on reduction gives compound C of molecular formula C_2H_6.

(a) Name A, B and C.

(b) Write chemical equation for the conversion of A to B.

(c) What is the role of conc H_2SO_4 in the above equation.

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59. Give a chemical test to distinguish between:

(i) Ethane and ethene

(ii) Ethanol and ethanoic acid

(iii) soaps and detergents.

Watch Video Solution

60. A compound 'X' is formed by the reaction of carboxylic acid $C_2H_2O_4$ and an alcohol in the presence of conc. H_2SO_4. This alcohol on treating with alkaline $KMnO_4$ gives the sae carboxylic acid used in the reaction. Give the name structure of carboxylic acid and alcohol. Write the reaction involving formation of 'X'.

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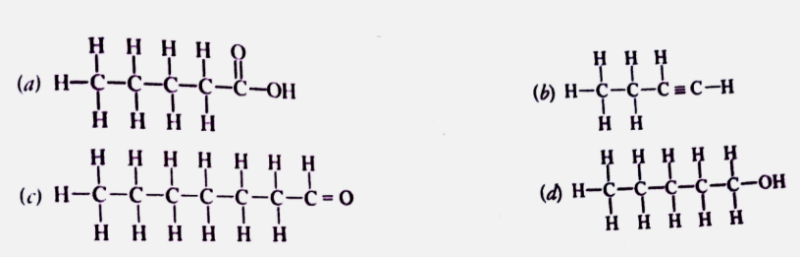
61. Draw the electron dot structure of ethyne and also draw its structure of ethyne and also its structural formula.

Watch Video Solution

62. Write the names of the following compounds:



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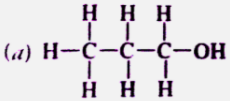
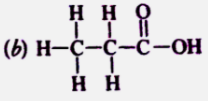
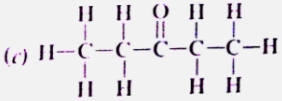
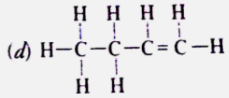
63. Identify and name the functional group present in the following compounds.









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64. A compounds X is fromed by the reaction of a carboxylic acid $C_2H_4O_2$ and an alcohol in the presence of a few drops of H_2SO_4. The alcohol on oxidation with alkalne $KMnO_4$ followed by acidification gives the same carboxylic 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.

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

Watch Video Solution

66. Name the functional groups present in the following compounds.

(a) $CH_3COCH_2CH_2CH_2CH_3$, (b) $CH_3CH_2CH_2COOH$

(c) $CH_3CH_2CH_2CH_2CHO$, (d) CH_3CH_2OH

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

70. Ethene is formed when ethanol at 443 K is heated with excess of concentrated sulphuric acid. What is the role of acid

in the this reaction ? Write the balanced chemical equation of this reaction.

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71. Carbon, group (14) element in the periodic table, is know to from compounds with many elements.

Write an example of a compound formed with

(a) chlorine (group 17 of periodic table)

(b) oxygen (group 16 of periodic table)

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

(a) The atomic number of chlorine is 17. Write its electronic

configuration.

(b) Draw the electron dot structure of chlorine molecule.

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73. 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.

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

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75. Match the reaction given in Column (A) with the names given in column (B):

Column (A)	Column (B)
(*a*) $CH_3OH + CH_3COOH \xrightarrow{H^+} CH_3COOCH_3 + H_2O$	(*i*) Addition reaction
(*b*) $CH_2 = CH_2 + H_2 \xrightarrow{Ni} CH_3—CH_3$	(*ii*) Substitution reaction
(*c*) $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl + HCl$	(*iii*) Neutralisation reaction
(*d*) $CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$	(*iv*) Esterification reaction

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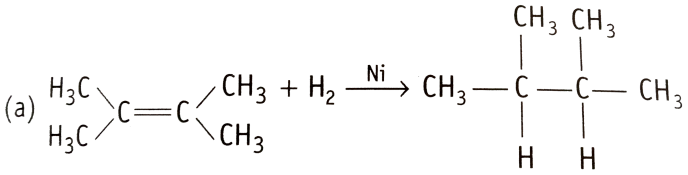
76. Write the structural formulae of all isomers of hexane.

Watch Video Solution

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

(a) 

(a)

(b)

$$CH_3COOH + CH_3CH_2OH \xrightarrow{Conc.\,H_2SO_4} CH_3COOC_2H_5 + H_2O$$

(c) $CH_3CH_2OH \xrightarrow[\text{Heat}]{\text{Alk.}KMnO_4} CH_3COOH$

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Long Answer Question

1. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields and organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formulae. What happens when 'A' and 'B' react

in the presence of an acid catalyst? Write the chemical equation for the reaction.

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2. (a) How are carboxylic acids different from mineral acids from ionisation point of view?

(b) Describe an activity to show how ethanoic acid reacts with sodium carbonate. Name the gas evolved. How can it be tested?

(c) State the principle on which the cleasing action of soap is based.

Watch Video Solution

3. (a) Distingusih between esterfication and saponification reactions with the help of chemical equations for each.

(b) With a labelled digaram describle in brief an acitivity to show the formation of an ester.

Watch Video Solution

4. An ester has the molecular formula $C_4H_8O_2$. Write its structural formula, what happens when this ester is heated in the presence of sodium hydroxide solution? Write the balanced chemical equation for the reaction and name the products. Wha si a saponification reaction?

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5. Two carbon compounds A and B have the molecular formulae 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 addition reaction is useful in vegetable ghee industry.

Watch Video Solution

6. Complete the following reaction:

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

(ii) $CH_3COOH + NaHCO_3 \rightarrow$

(iii) $CH_4 + Cl_2 \xrightarrow{\text{sunlight}}$

(iv) $CH_2 = CH_2 + H_2 \xrightarrow{Ni}$

(v) $C_2H_5OH + O_2 \xrightarrow{Alk.\quad KMnO_4}$

Watch Video Solution

7. (i) How will you bring about following conversion? Write the concerned chemical equations:

(a) Ethanol to Ethene (b) Ethanol to Ethanoic acid.

(ii) Give one example with chemical equation for following reactions:

(a) Substitution reaction (b) saponification (c) combustion reaction.

Watch Video Solution

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

(b) name the products formed when ethanol burns in air. List two forms of energy that are liberated on burning ethanol.

(c). Why is the reaction between methane ad chlorine considered to be a substitution reaction?

View Text Solution

9. (i) Write one advantage and disadvantage of using ethanol.

(ii) State the role of ethanol in the formation of ester. Explain it with the help of chemical equation.

(iii) Write the name of the products obtained on burning ethanol in air. Write the chemical equation too.

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10. The cap of plastic bottle shown in the figure is made up of polypropene and the bottle is made of plyethene.

(i) Why are polyethene and polyrpropene not echofriendly

with us?

(ii) Differentiate between ethane and ethene and write the one important use of ethene.

Watch Video Solution

11. Account for the following statements:

(i) Ethene is a covalent compound.

(ii) Carbon atoms from a strong bond.

(iii) Carbon shows catenation property.

(iv) Pentane has higher boiling point than methane.

(v) Alkenes have double bonds.

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12. Write the common name of ethanoic acid and the functional group present in it. Explain any of its three chemical properties with chemical equations for each.

Watch Video Solution

13. What is the difference between molecules of soap is added to water? Will a micelle be formed in other solvents such as ethanol also? State briefly how the formation of micelles helps to clean the clothes having oily spots.

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14. What are micelles? How is it formed when soap is added to water? Will a micelle be formed in other solvents such as

ethanol also? State briefly how the formation of micelles helps to clean the clothes having oily spots.

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15. Both soap and detergent are some type of salts. What is the difference between them?

Describe in brief the cleansing action of soap. Why do soaps not form lather in head water?

List two problems that arise due to the use of detergents instead of soaps .

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16. Write a chemical test to distinguish between ethanol ad ethanoic acid.

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17. Vegetable oils generally have long unsaturated carbon chains. Give the chemical reaction for hydrogenation of vegetable oil. Name the catalyst used in the reaction. What role does a catalyst play in the reaction?

Watch Video Solution

18. A compound A $(C_2H_4O_2)$ 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 an acid forms a sweety smelling compound 'D' $(C_4H_8O_2)$. On addition of naoH to 'D' gives back B and C. Identify A,B,C and D. Write the reaction involved.

OR

(a) Explain why carbon forms covalent bond? Give two reasons for carbon forming a large number of compounds.

(b) Explain the structure of ammonia molecule.

Watch Video Solution

19. An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields and organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formulae. What happens when 'A' and 'B' react in the presence of an acid catalyst? Write the chemical equation for the reaction.

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20. (a) Distingusih between esterfication and saponification reactions with the help of chemical equations for each.

(b) With a labelled digaram describle in brief an acitivity to show the formation of an ester.

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21. (a) What are homologous series of compounds? List any two characteristics of homologous series.

(b) What would be observed by adding a 5% solution of alkaline potassium permanganate drop by drop to warm ethanol taken in a test tube? Write the name of the compound formed during the chemical reaction.

(c) How would you distinguish expermentally between an

alcohol and a carboxylic acid on the basis of a chemical property?

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22. (a) Draw the structure of methane by showing sharing of electron between carbon and hydrogen atoms. How will you convert methane into chloroform $(CHCl_3)$ by substitution reaction? Explain with the help of chemical equations.

(b) Write the name and general formula of a chain of hydrocarbons in which an addition reaction with hydrogen can take place. stating the essential conditions reuqired for an addition reaction to occur, write the chemical equation giving the name of the reactant and the product of such a reaction.

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23. (a) State the meaning of functional group in a carbon compound. Write the functional group present in (i) ethanol and (ii) ethanoic acid. Draw their structures.

(b) What will you observe when you drop a small piece of sodium into ethanol? Name the gas evolved. How will you test this gas? Write the chemical equation of the reaction taking place.

Watch Video Solution

24. A salt X is formed and a gas is evolved when ethanoic acid reacts with sodium hydrogen carbonate. 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 the chemical equation of the reaction involved.

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25. (a) What are hydrocarbons ? Give examples.

(b) Give the structural differences between saturated and unsaturated hydrocarbons with two examples each.

(c) What is functional group ? Examples of four different functional groups.

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26. Name the reaction which is commonly used in the conversion of vegetable oil to fats. Explain the reaction involved in detail.

Watch Video Solution

27. (a) Write the formula and draw electron dot structure of carbon tetrachloride.

(b) What is saponification ? Write the reaction involved in this process.

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28. 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 labelled diagram.

Watch Video Solution

29. A compound C (molecular formula, $C_2H_4O_2$) reacts with Na metal to form a compounds R and evolves a gas which burns with a pop sound. Compound C on treatment with an alcohol A in the presence of an acid form a sweet smelling compound S (molecular formula, $C_3H_6O_2$). 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.

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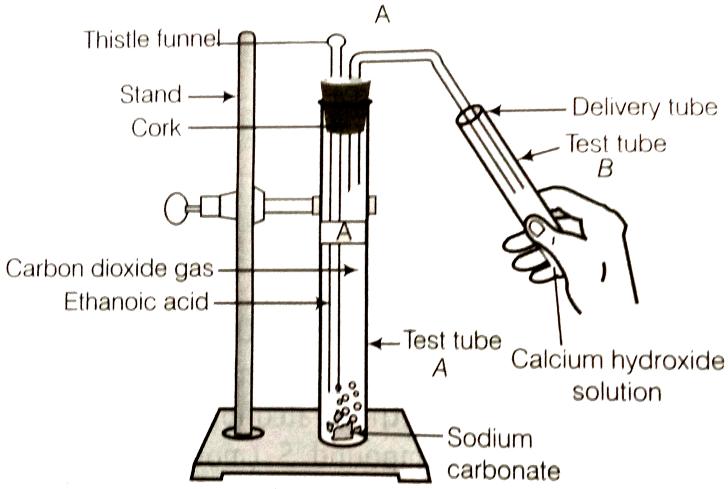
30. Look at the figure and answer the following questions.



(a) What change would you observe in the calcium hydroxide solution taken in tube B ?

(b) Write the reaction involved in test tubes A and B respectively.

(c) If ethanol is given instead of ethanoic acid, would you expect same change ?

(d) How can a solution of lime water be prepared in the laboratory ?

Watch Video Solution

31. 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.

Watch Video Solution

32. Draw the possible isomers of the compound with molecular formula C_3H_6O and also give their electron dot structures.

Watch Video Solution

33. Explain the given reactions with the examples.

(a) Hydrogenation reaction , (b) Oxidation reaction

(c) Substitution reaction , (d) Saponification reaction

(e) Combustion reaction

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34. 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 compounds C. One mole od compound C on combustion form two moles of CO_2 and three moles of H_2O. Identify the compounds A,B and C write the chemical equation of the reactions involved.

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Higher Order Thinking Skill Based Question

1. An organic compound A of molecular formula C_2H_4 on reduction gives another compound B of molecular formula C_2H_6. B on reaction with chlorine in the presence of sunlight gives C of molecular formula C_2H_5Cl.

(a) name the compound A,B and C

(b) Write chemical equation for the conversion of A to B and name the type of reaction.

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2. Name the functional group of organic compounds that can be hydrogenated .With the help of a suitable example explain the process of hydrogenation , mentioning the conditions of the reaction and any one change in physical property with the

formation of the product. Name any one natural source of organic compounds that are hydrogenated

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3. An organic compound 'A' is a constituent of antifreeze and has the molecular formula C_2H_6O. Upon reaction with alkaline $KMNO_4$, the compound 'A' is oxidised to another compound 'B' with formla $C_2H_6O_2$. Identify the compounds 'A' and 'B'. Write the chemical equation for the reaction which leads to the formation of 'B'.

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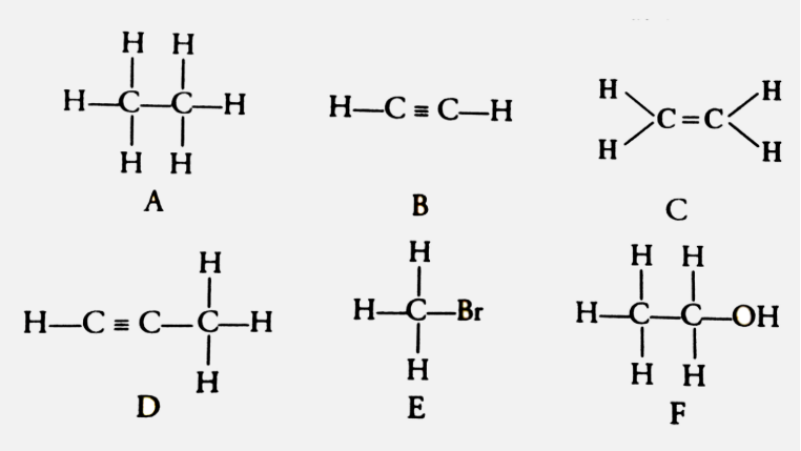
4. A to F are the structural formulae of some organic compound



(i) give the letter which represent the family.

(ii) Give the letters which donot represent hydrocarbons.

(iii) How can 'C' be converted into 'A'?

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5. (a) Test tube contains a brown liquid in it. The colour of the liquid remains the same when methane is passed through it but it disappears when ethene is passed. Suggest the name of the liquid brown in colour. Give the chemical equaiton involved.

(b) the formula of an ester is $C_3H_7COOC_2H_5$. Write the formulae of the acid and alcohol from which the ester is prepared.

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Mcqs

1. Carbon exists in the atmosphere in the from of

A. carbon monoxide only

B. carbon monoxide and carbon dioxide in traces

C. carbon dioxide only

D. coal gas.

Answer: B

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2. Which of the following statements are usually correct for carbon compounds ? These

(i) are good conductors of electricity.

(ii) are poor conductors of electricity.

(iii) have strong forces of attraction between their molecules.

(iv) do not have strong forces of attraction between their molecules.

A. (i) and (iii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

Answer: D

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3. A molecule of ammonia (NH_3) has

A. only single bonds

B. only double bonds

C. only triple bonds

D. two double bonds and two single bonds.

Answer: A

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4. Buckminster fullerene is an allotropic form of

A. nitrogen

B. sulphur

C. carbon

D. tin

Answer: C

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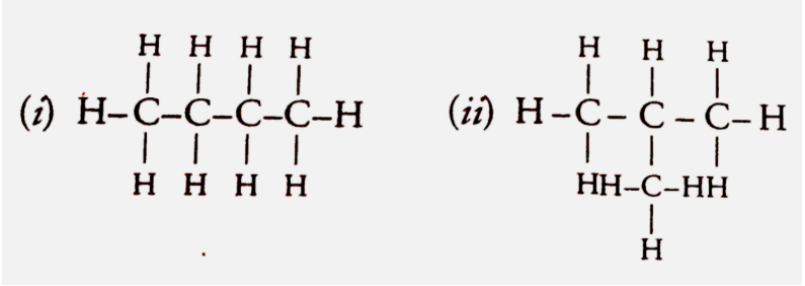
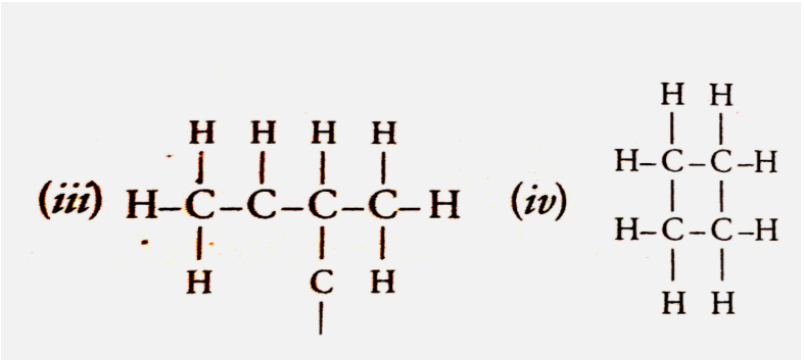
5. Which of the following are correct chain isomers of butane

?

(i)





A. (i) and (iii)

B. (ii) and (iv)

C. (i) and (ii)

D. (iii) and (iv)

Answer: C

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6. $CH_3 - CH_2 - OH \xrightarrow{\text{Alkaline} KMnO_4 + \text{Heat}} CH_3 - COOH$

In the above given reaction, alkaline $KMnO_4$ acts as

A. reducing agent

B. oxidising agent

C. catalyst

D. dehydrating agent.

Answer: B

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7. Oils on treating with hydrogen in the presence of palladium or nickel catalyst from fats. This is an example of

A. addition reaction

B. substitution reaction

C. Displacement reaction

D. Oxidation reaction

Answer: A

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8. In which of the following compounds -OH is the functional group ?

A. Butanone

B. Butanol

C. Butanoic acid

D. Butanal

Answer: B

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9. The soap molecule has a

A. hydrophilic head and a hydrophobic tail

B. hydrophobic head and a hydrophilic tail

C. hydrophobic head and a hydrophobic tail

D. hydrophilic head and a hydrophilic tail

Answer: A

Watch Video Solution

10. Which of the following is the correct representation of electon dot structure of nitrogen ?

A. $:\dot{\underset{\cdot\cdot}{N}}:\dot{\underset{\cdot\cdot}{N}}:$

B. $:\dot{N}::\dot{N}:$

C. 

D. 

Answer: D

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11. Structural formula of ethyne is

A. $HC \equiv CH$

B. $H_3C - C \equiv CH$

C. 

D. $HC = CH$

Answer: A

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12. Indentify the unsaturated compounds from the following.

(i) Propane

(ii) Propene

(iii) Propyne

(iv) Chloropropane

A. (i) and (ii)

B. (ii) and (iv)

C. (iii) and (iv)

D. (ii) and (iii)

Answer: D

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13. Chlorine reacts with saturated hydrocarbons at room temperature in the

A. absence of sunlight

B. presence of sunlight

C. presence of water

D. presence of hydrochloric acid

Answer: B

Watch Video Solution

14. In the soap micelles

A. the ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster.

B. ionic end of soap is in the interior of the cluster and the carbon chain is out of the cluster.

C. both ionic end and carbon chain are in the interior of the cluster.

D. both ionic end and carbon chain are on the exterior of the cluster.

Answer: A

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15. Pentane has the molecular formula C_5H_{12}. It has

A. 8 covalent bonds

B. 10 covalent bonds

C. 16 covalent bonds

D. 14 covalent bonds

Answer: C

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16. Structural formula of benzene is

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

17. Ethanol reacts with sodium and forms two products. These are

A. sodium ethanoate and hydrogen

B. sodium ethanoate and oxygen

C. sodium ethoxide and hydrogen

D. sodium ethoxide and oxygen

Answer: C

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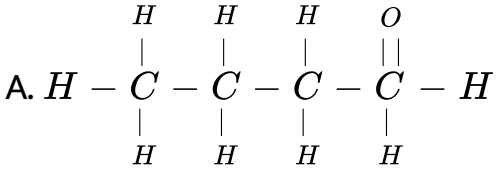
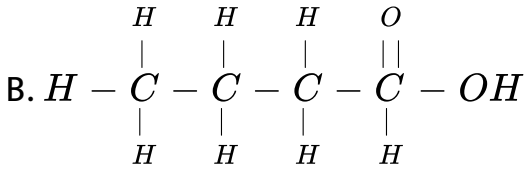
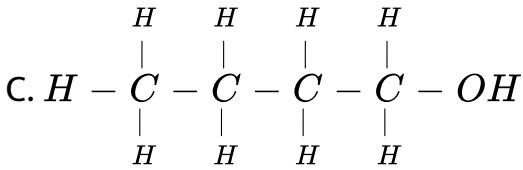
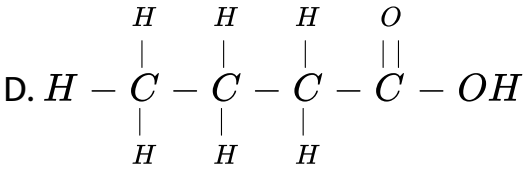
18. The correct structural formula of butanoic acid is

A. 

B. 

C. 

D. 

Answer: D

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19. Vinegar is a solution of

A. 30%-40% acetic acid in alcohol

B. 5%-8% acetic acid in alcohol

C. 5%-8% acetic acid in water

D. 15%-20% acetic acid in water

Answer: C

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20. Mineral acids are stronger acids than carboxylic acids because

(i) mineral acids are completely ionised.

(ii) carboxylic acids are completely ionised.

(iii) mineral acids are partially ionised.

(iv) carboxylic acids are partially ionised.

A. (i) and (iv)

B. (ii) and (iii)

C. (i) and (ii)

D. (iii) and (iv)

Answer: A

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21. Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms, e.g., hydrogen.

After the formation of four bonds, carbon attains the electronic configuration of

A. helium

B. neon

C. argon

D. krypton

Answer: B

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22. The correct electron dot structure of a water molecule is

A. $H:O:H$

B. $H\dot{\underset{\cdot}{O}}:H$

C. $H:\ddot{\underset{\cdot\cdot}{O}}:H$

D. $H-\ddot{O}-H$

Answer: C

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23. Which of the following is not a straight chain hydrocarbon ?

A. $CH_3-CH_2-CH_2-\underset{\underset{CH_3}{|}}{C}\ H_2$

B. $H_3C-CH_2-CH_2-CH_2-CH_3$

C. $H_2\overset{\overset{H_3C}{|}}{C}-H_2C-H_2C-CH_3$

D. 

Answer: D

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24. Which amond the following are unsaturated hydrocarbons ?

(i) $H_3C - CH_2 - CH_2 - CH_3$

(ii) $H_3C - C \equiv C - CH_3$

(iii) $H_3C - \underset{\underset{CH_3}{|}}{CH} - CH_3$

(iv) $H_3C - \underset{\underset{CH_3}{|}}{C} = CH_2$

A. (i) and (iii)

B. (ii) and (iii)

C. (ii) and (iv)

D. (iii) and (iv)

Answer: C

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25. The IUPAC name of the compound $CH_3 - CH_2 - CHO$ is

A. Propanal

B. Propanone

C. Ethanol

D. Ethanal

Answer: A

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26. The hateroatoms present in

$CH_3 - O - CH_2 - CH_2(Br)$ are

(i) oxygen

(ii) carbon

(iii) hydrogen

(iv) bromine

A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iv)

Answer: D

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27. Which of the following does not belong to the same homologous series?

A. CH_4

B. C_2H_6

C. C_3H_8

D. C_3H_6.

Answer: D

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28. The first member of alkene family is

A. ethyne

B. ethene

C. propyne

D. ethane

Answer: B

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29. Which of the following represents saponification reaction ?

A. $CH_3COONa + NaOH \xrightarrow{CaO} CH_4 + Na_2CO_3$

B.

$$CH_3COOH + C_2H_5OH \xrightarrow{H_2SO_4} CH_3COOC_2H_5 + H_2O$$

C. $2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$

D.

$$CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$$

Answer: D

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