

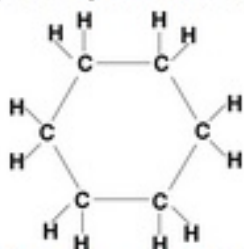


Solution 60

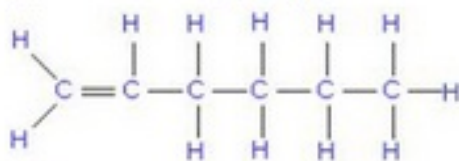
- (a) Element X : Carbon
- (b) Allotrope Y: Graphite
- (c) Y is a good conductor of electricity.
- (d) Y is used for making graphite electrodes or carbon electrodes in dry cells.
- (e) Allotropes of X: Diamond and buckminsterfullerene

Solution 61

(a) A is cyclohexane,  $C_6H_{12}$



(b) B is hexene,  $C_6H_{12}$



(c) B

(d) A

Solution 62

- (a) Element A: Carbon
- (b) Gas B: Carbon dioxide
- (c) Allotrope C: Diamond
- (d) Used for making jewellery
- (e) Buckminsterfullerene
- (f) Graphite

Solution 63

- (a) Element E: Carbon
- (b) Allotrope A: Buckminsterfullerene
- (c) Allotrope B: Graphite
- (d) Allotrope C: Diamond
- (e) C
- (f) B

Solution 64

- (a)  $C_6H_{12}$
- (b)  $C_6H_6$
- (c)  $C_7H_{14}$ ;  
 $C_5H_{10}$ ;  $C_6H_{12}$
- (d)  $C_5H_8$ ;  
 $C_7H_{12}$
- (e)  $C_7H_{14}$ ;  
 $C_5H_{10}$ ;  $C_6H_{12}$

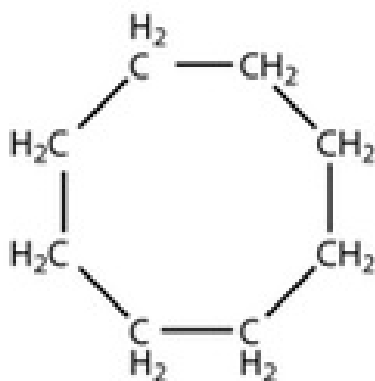
Solution 65

$C_3H_4$

Solution 66

Molecular formula:  $C_8H_{16}$

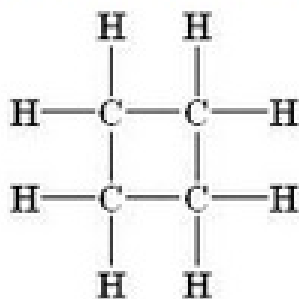
Molecular formula:  $C_8H_{16}$



Solution 67

Molecular formula:  $C_4H_8$

Molecular formula:  $C_4H_8$



Solution 68

(i)  $C_{20}H_{42}$

(ii)  $C_{20}H_{40}$  (iii)  $C_{20}H_{38}$

Solution 69

$C_5H_{10}$

Solution 70

$C_3H_4$

Solution 1

$C_2H_5OH$

Solution 2

Ethanol ( $C_2H_5OH$ )

Solution 3

Alcohol group; Methanol

Solution 4

Common name: formaldehyde

IUPAC name: methanal

Solution 5

Formaldehyde

Solution 6

(i) Alkyne

(ii) Alkene

Solution 7

Propanone

Solution 8

Acetone

Solution 9

(i) Propanone

(ii) Butanone

Solution 10

Formic acid;  $HCOOH$

Solution 11

IUPAC name	Common name	Formula
(i) Methanoic acid	Formic acid	HCOOH
(ii) Ethanoic acid	Acetic acid	CH <sub>3</sub> COOH

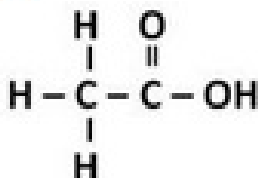
Solution 12

(a) Methanoic acid - Formic acid

(b) Ethanoic acid - Acetic acid

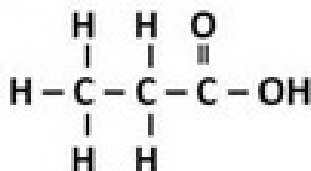
Solution 13

(a)



**Ethanoic acid**

(b)



**Propanoic acid**

Solution 14

Formula	IUPAC name	Common name
(i) HCOOH	Methanoic acid	Formic acid
(ii) CH <sub>3</sub> COOH	Ethanoic acid	Acetic acid

Solution 15

Ethanoic acid; CH<sub>3</sub>COOH

Solution 16

(a) Methanoic acid: HCOOH

(b) Ethanoic acid: CH<sub>3</sub>COOH

Solution 17

Common name: Ethyl alcohol

IUPAC name: Ethanol

Solution 18

Propanol, C<sub>3</sub>H<sub>7</sub>OH

Solution 19

Ethanol; C<sub>2</sub>H<sub>5</sub>OH

Solution 20

(a) Butanol, C<sub>4</sub>H<sub>9</sub>OH

(b) Pentanol, C<sub>5</sub>H<sub>11</sub>OH

Solution 21

Methyl alcohol

Solution 22

(i) 14 u

(ii) Two consecutive homologues differ by 1 carbon atom and 2 hydrogen atoms in their molecular formulae.

Solution 23

(a) Fuels which vaporise on heating, burn with a flame.

(b) Fuels which do not vaporise on heating, burn without a flame.

Solution 24

False

Solution 25

(a) Propanol

(b)  $C_3H_7OH$

(c) Propane

(d) -OH (alcohol)

(e) Carboxylic acids

Solution 26

(a) Alkynes,  $C_nH_{2n-2}$

First member: Ethyne

(b) Second member:  $C_3H_6$

Fourth member:  $C_5H_{10}$

(c) Third member:  $C_3H_8$

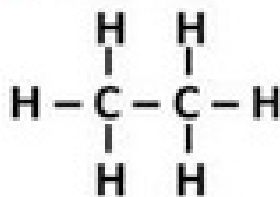
Fifth member:  $C_5H_{12}$

Solution 27

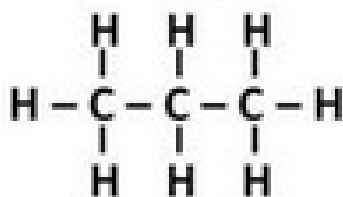
(a)

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(a)



Ethane



Propane

(b) Alkyne;  $C_nH_{2n-2}$

(c) Alkanes:  $C_3H_8$ ,  $C_4H_{10}$

Alkenes:  $C_5H_{10}$ ,  $C_8H_{16}$

Alkynes:  $C_6H_{10}$ ,  $C_7H_{12}$

Solution 28

(a) (i)  $C_4H_8$  (ii)  $C_3H_8$

(iii)  $C_3H_4$

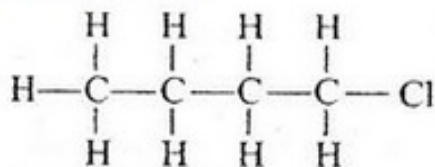
(b) 14 u

(c) 1 carbon atom and 2 hydrogen atoms i.e. a  $CH_2$  group.

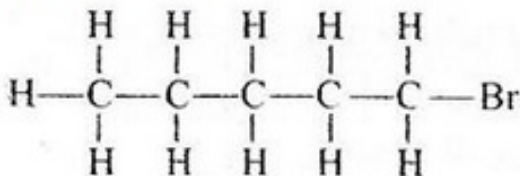
Solution 29

Solution 30

- (a) IUPAC name: Chloromethane  
Common name: Methyl chloride  
(b) Chlorobutane:



- (c) Bromopentane:



Yes, structural isomers are possible for bromopentane.

Solution 31

- (a) Acetone -  $\text{CH}_3\text{COCH}_3$   
(b) (i) Chloromethane -  $\text{CH}_3\text{Cl}$   
(ii) Chloroethane -  $\text{C}_2\text{H}_5\text{Cl}$   
(iii) Chloropropane -  $\text{C}_3\text{H}_7\text{Cl}$   
(c) Ethylbromide  
(a) Ketones  
(b)  $\text{CH}_3\text{COOH}$   
(c) Formaldehyde

Solution 33

(a) A homologous series is a group of organic compounds having similar structures and similar chemical properties in which the successive compounds differ by  $\text{CH}_2$  group.

Ethyl alcohol:  $\text{C}_2\text{H}_5\text{OH}$

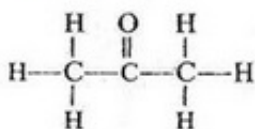


**Ethyl Alcohol**

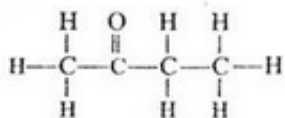
- (b)  $\text{C}_3\text{H}_7\text{OH}$   
(c) Coal and petroleum

Solution 34

- (a) (i) Propanone



- (ii) Butanone



- (b) (i) Methanal (ii) Ethanal (iii) Propanal (iv) Butanal  
(c) Alcohol group,  $-\text{OH}$ ;  $\text{C}_4\text{H}_9\text{OH}$

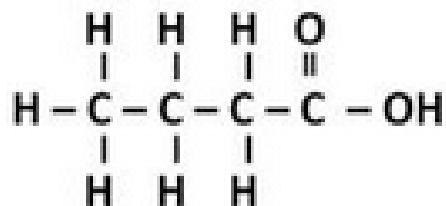
Solution 35

(a)  $\text{CH}_3\text{COOH}$ : Ethanoic acid

$\text{CH}_3\text{CHO}$ : Ethanal

$\text{CH}_3\text{OH}$ : Methanol

(b)



Butanoic acid

(c) Ethanoic acid.

Solution 36

(a) Carboxylic acid group,  $-\text{COOH}$ ;  $\text{C}_4\text{H}_9\text{COOH}$

(b) (i) Ethanal -  $\text{CH}_3\text{CHO}$

(ii) Methanol -  $\text{CH}_3\text{OH}$

(iii) Ethanoic acid -  $\text{CH}_3\text{COOH}$

(iv) Chloromethane -  $\text{CH}_3\text{Cl}$

(c) (i) Ethene:  $\text{CH}_2 = \text{CH}_2$

(ii) Ethyne:  $\text{CH} \equiv \text{CH}$

Solution 37

(a)  $\text{C}_5\text{H}_{12}\text{O}$  or  $\text{C}_5\text{H}_{11}\text{OH}$

(b) (i) Aldehyde group

(ii) Alcohol group

(iii) Carboxylic acid group

(iv) Ketone group

(v) Halo group

(c) When a candle is lighted, the wax melts, rises up the wick and gets converted into vapours. In a candle, there is no provision for the proper mixing of oxygen (of air) for burning wax vapours. So, the wax vapours burn in an insufficient supply of oxygen (of air) which leads to incomplete combustion of wax. This incomplete combustion of wax produces small unburnt carbon particles. These solid carbon particles rise in the flame, get heated and glow to give out yellowish light. This makes the candle flame yellow and luminous.

Solution 38

(a) A homologous series is a group of organic compounds having similar structures and similar chemical properties in which the successive compounds differ by  $\text{CH}_2$  group.

Example of Homologous series: All the alkanes have similar structures with single covalent bonds and show similar chemical properties, so they can be grouped together in the form of a homologous series.

Homologous series of alkanes: Methane,  $\text{CH}_4$ ; Ethane,  $\text{C}_2\text{H}_6$ ;

Propane,  $\text{C}_3\text{H}_8$ ; Butane,  $\text{C}_4\text{H}_{10}$ ; Pentane,  $\text{C}_5\text{H}_{12}$

(b) (i) All the members of the homologous series can be represented by the same general formula.

(ii) Any two adjacent homologues differ by 1 carbon atom and 2 hydrogen atoms in their molecular formulae.

(c) Alkene,  $\text{C}_n\text{H}_{2n}$

(d) Alkanes:  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$ ,  $\text{C}_4\text{H}_{10}$ ?

Alkenes :  $C_2H_4$ ,  $C_3H_6$

Alkynes :  $C_2H_2$ ,  $C_3H_4$

(e) In an organic compound, any atom other than carbon and hydrogen is called a heteroatom.

Example: Chlorine (Cl), Bromine (Br), Oxygen (O)

Chloromethane -  $CH_3Cl$  and methanol -  $CH_3OH$

Solution 39

(a) An 'atom' or 'a group of atoms' which makes a carbon compound (or organic compound) reactive and decides its properties (or functions) is called a functional group. The alcohol group,  $-OH$ , present in ethanol,  $C_2H_5OH$ , is an example of a functional group.

(b) (i) Halo group:  $-X$

(ii) Alcohol group:  $-OH$

(iii) Aldehyde group:  $-CHO$

(c) (i) Carboxylic acid group

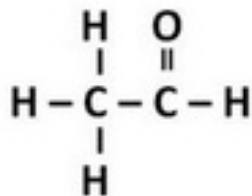
(ii) Aldehyde group

(iii) Alcohol group

(iv) Ketone group

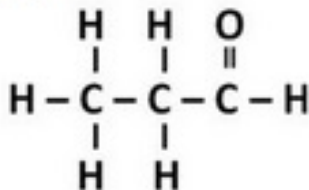
(d) Ketone group,  $-CO-$

(e) (i)



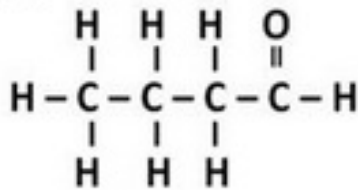
**Ethanal**

(ii)



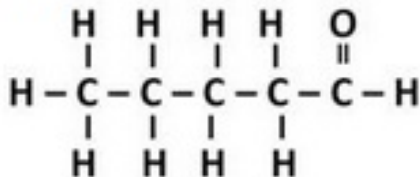
**Propanal**

(iii)



**Butanal**

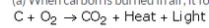
(iv)



**Pentanal**

Solution 40

(a) When carbon is burned in air, it forms carbon dioxide gas and releases a large amount of heat and some light:



(b) Coal and petroleum are called as fossil fuels because they were formed by the decomposition of the remains of the pre-historic plants and animals (fossils) buried under the earth long, long, ago.

(c) Coal was formed by the decomposition of large land plants and trees buried under the earth millions of years ago. It is believed that millions of years ago, due to earthquakes and volcanoes, etc., the forests were buried under the surface of the earth and got covered with sand, clay and water. Due to high temperature and high pressure inside the earth, and in the absence of air, wood was converted into coal.

(d) Petroleum oil (and natural gas) was formed by the decomposition of the remains of extremely small plants and animals buried under the sea millions of years ago. It is believed that millions of years ago, the microscopic plants and animals which lived in seas, died. Their bodies sank to the bottom of the sea and were soon covered with mud and sand. The chemical effects of pressure, heat and bacteria, converted the remains of microscopic plants and animals into petroleum oil and natural gas just as they converted forest trees into coal. This conversion took place in the absence of oxygen or air. The petroleum thus formed got trapped between two layers of impervious rocks (non-porous rocks) forming an oil trap.

(e) Natural gas.

\*\*\*\*\* END \*\*\*\*\*