



Solution 1

Carbon

Solution 2

Catenation(Self linking of carbon atoms to form long chains) and Tetravalency.

Solution 3

False

Solution 4

Friedrich Wohler.

Solution 5

Carbon.

Solution 6

n-butane and iso-butane.

Solution 7

(a) 20 hexagons

(b) 12 pentagons

Solution 8

Graphite

Yes, current will flow through the circuit since graphite is a good conductor of electricity.

Solution 9

Graphite is used as a lubricant in the form of graphite powder or mixed with petroleum jelly or with any lubricant oil to form graphite grease.

Solution 10

Diamond

Solution 11

C_{60} is called buckminsterfullerene

Solution 12

Methyl

Methyl

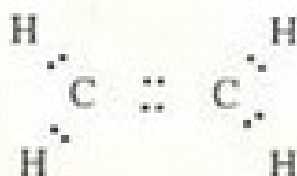


Solution 13

(a) Ethane



(b) Ethene



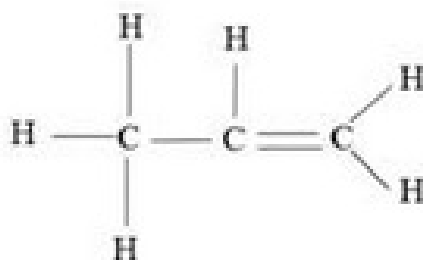
(c) Ethyne



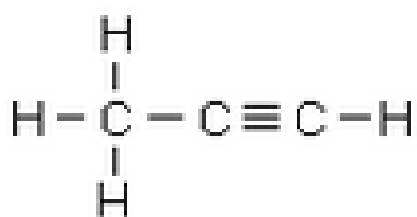
Solution 14

Ethane.

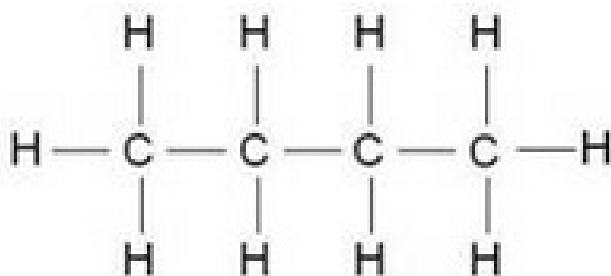
Solution 15



Solution 16



Solution 17



Solution 18

Isomers.

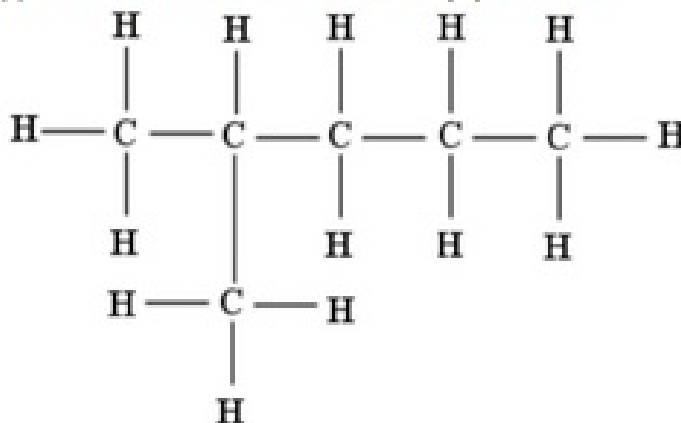
Solution 19

Isopentane and neopentane.

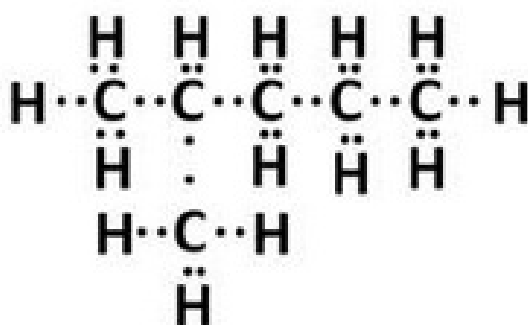
Solution 20

(i) Isomer of hexane: 2-methylpentane

(i) Isomer of hexane: 2-methylpentane



(ii)



Solution 21

- (a) Graphite
- (b) Graphite
- (c) Hydrocarbons
- (d) Alkene
- (e) Alkynes
- (f) Unsaturated
- (g) Two
- (h) Low; covalent
- (i) Catenation
- (j) Alkenes
- (k) Ethene
- (l) Ethyne

Solution 22

(a) The atomic number of carbon is 6. Its electronic configuration is 2,4.

(b) Carbon forms covalent bonds because it can achieve the inert gas electron arrangement only by sharing of electrons.

(c) Diamond, graphite and buckminsterfullerene.

Solution 23

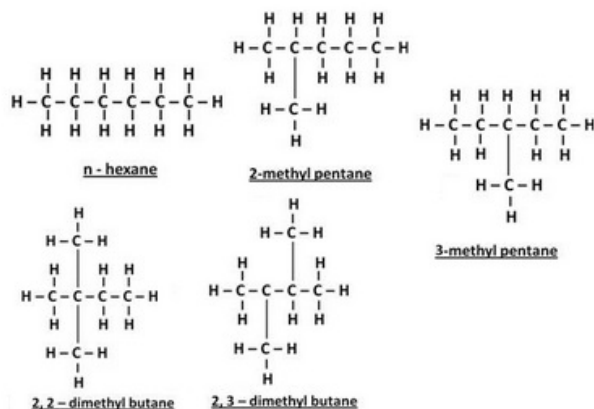
(a) Hydrocarbons

(b) Carbon forms covalent bonds because it can achieve the inert gas electron arrangement only by sharing of electrons.

Solution 24

(a) The property of self combination of carbon atoms to form long chains is called catenation. Carbon and Silicon exhibit the property of catenation.

(b)



Solution 25

(a) Buckminsterfullerene is an allotrope of carbon containing clusters of 60 carbon atoms joined together to form spherical molecules. It burns on heating to form carbon dioxide and nothing is left behind. This shows that it is made up of carbon only like diamond and graphite.

(b) Diamond used for making cutting tools but graphite is not because diamond is a very hard substance and graphite is a soft substance.

(c) Graphite is used for making dry cell electrodes but diamond is not because graphite is a good conductor of electricity whereas diamond is a bad conductor of electricity.

Solution 26

(a) (i) C_nH_{2n+2}

(ii) C_nH_{2n}

(iii) C_nH_{2n-2}

Alkanes:

C_5H_{12}

C_3H_8

Alkenes:

C_2H_4

C_4H_8

Alkynes:

C_3H_4

C_5H_8

Solution 27

(a) (i) Ammonium cyanate, NH_4CNO

(ii) Urea, $CO(NH_2)_2$

(b) The molecular formula of butane is C_4H_{10} ; Its isomers are n-butane and 2-methylpropane; LPG.

Solution 28

(a) Methane (single bond): CH_4

Ethyne (triple bond): C_2H_2

(b) Benzene: C_6H_6

(c) Isobutene

Solution 29

Carbon forms strong bonds among themselves and with other elements and this makes the carbon compounds stable whereas silicon shows catenation property due to which it forms compounds with hydrogen having chains of up to 7 or 8 silicon atoms; but due to weak bonds, these compounds are unstable.

Solution 30

(a) Diamonds can be made artificially by subjecting pure carbon to very high pressure and temperature. The synthetic diamonds are small whereas natural diamonds are big.

(b) (i) Diamond is hard whereas graphite is soft.

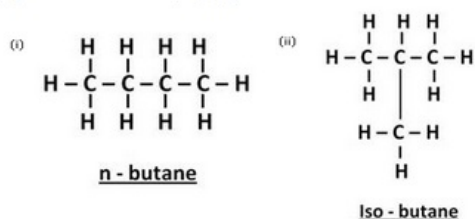
(ii) Diamond is a non-conductor of electricity whereas graphite is a good conductor of electricity. The difference in the physical

properties of diamond and graphite arises because of the different arrangements of carbon atoms in them.

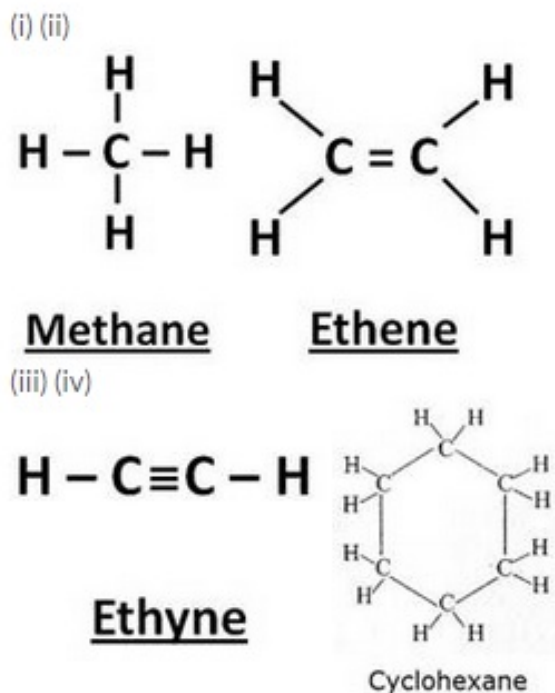
Solution 31

(a) Carbon forms a large number of carbon compounds because carbon atoms can link with one another by means of covalent bonds to form long chains of carbon atoms.

(b) Isomers of butane (C_4H_{10})

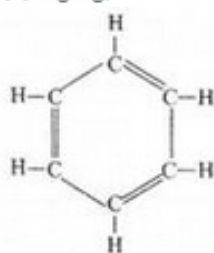


Solution 32



(b) (i) Acetylene (ii) Ethylene

(c) C_6H_6 ;



(b) (i) Acetylene

(ii) Ethylene

(c) C_6H_6 ;

Solution 33

(a) The most unique property of carbon atom is its ability to combine itself, atom to atom to form long chains. This property of self combination is useful to us because it gives rise to an extremely large number of carbon compounds (or organic compounds).

(b) A diamond crystal is a giant molecule of carbon atoms. Each carbon atom in the diamond crystal is linked to four other carbon atoms by strong covalent bonds. The four surrounding atoms are at the four vertices of a regular tetrahedron. This rigid structure of diamond makes it a very hard substance.

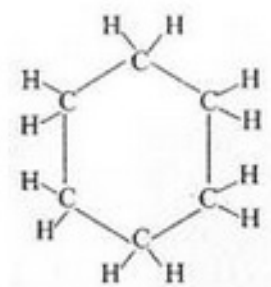
The structure of graphite is very different from that of diamond. A graphite crystal consists of layers of carbon atoms or sheets of carbon atoms and these layers are held together by weak Van der

Waals forces. Due to this sheet like structure, graphite is a comparatively soft substance.

Solution 34

- (a) (i) Ethyne:- Single bonds: Two; Triple bond: One
(ii) Ethene:- Single bonds: Four; Double bond: One
(iii) Ethane:- Single bonds: Nine; Double bonds: Three

(b) Molecular formula of cyclohexane: C_6H_{12}



Cyclohexane

No. of covalent bonds: 18

Solution 35

(a) Diamond:

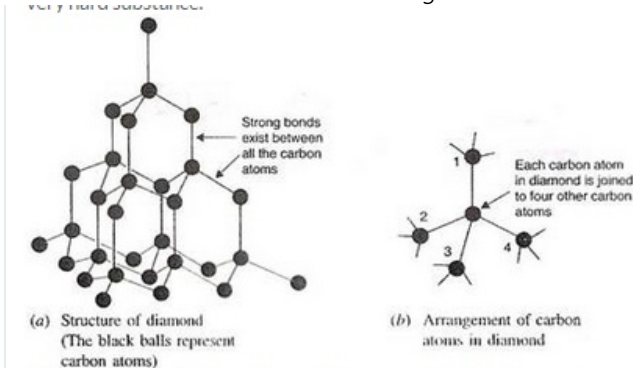
- (i) Each carbon atom is linked to four other carbon atoms.
(ii) A diamond crystal has a tetrahedral arrangement of carbon atoms.

Graphite:

- (i) Each carbon atom is joined to only three other carbon atoms.
(ii) A graphite crystal has flat hexagonal rings structure.
(b) Due to its softness, powdered graphite can be used as a lubricant whereas diamond being extremely hard can not be used as a lubricant.
(c) Due to its rigid structure, diamond is the hardest known substance to man. Hence, it is used in rock drilling equipments but graphite is soft and hence not used in rock drilling equipments.
(d) Diamonds are used for making jewellery.
Graphite is used for making pencil cores or 'pencil leads'.

Solution 36

- (a) Diamond is a colourless transparent substance having extraordinary brilliance. It is made up of carbon.
(b) A diamond crystal is a giant molecule of carbon atoms. Each carbon atom in the diamond crystal is linked to four other carbon atoms by strong covalent bonds. The four surrounding carbon atoms are at the four vertices of a regular tetrahedron. This rigid structure of diamond makes it a very hard substance.

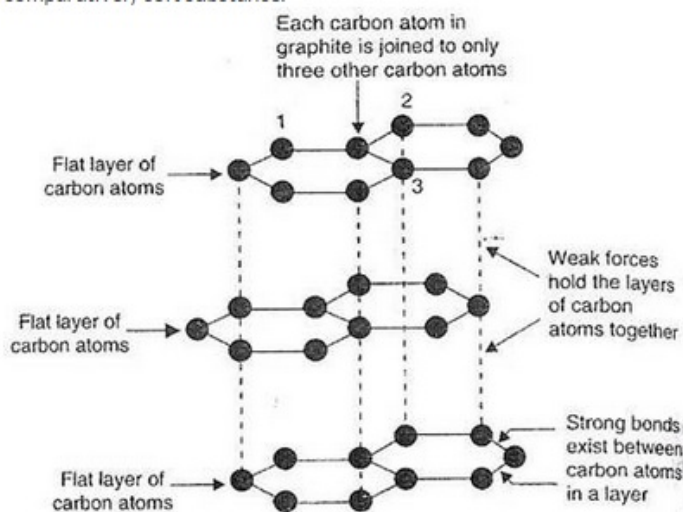


- (c) Diamond has a high melting point because a lot of heat energy is required to break the network of strong covalent bonds in the diamond crystal.
(d) (i) Used in rock drilling equipment
(ii) Used in making jewellery.

Solution 37

- (a) Graphite is a greyish-black opaque substance. It is made up of carbon.
(b) The structure of graphite is very different from that of diamond.

A graphite crystal consists of layers of carbon atoms or sheets of carbon atoms. Each carbon atom in a graphite layer is joined to other three carbon atoms by strong covalent bonds to form flat hexagonal rings. The various layers of carbon atoms in graphite are held together by weak Van der Waals forces. Due to this sheet like structure, graphite is a comparatively soft substance.



(c) Due to the presence of free electrons in a graphite crystal, it conducts electricity however; a diamond crystal does not have free electrons so it does not conduct electricity.

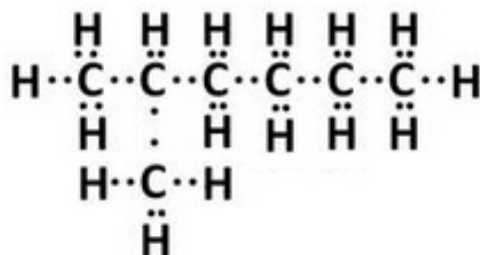
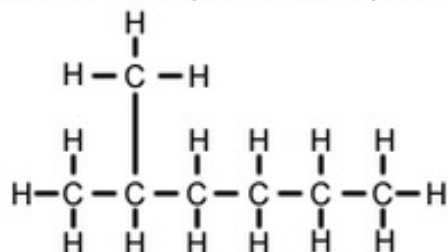
(d) (i) Used as a lubricant

(ii) Used for making pencil leads.

Solution 38

(a) The organic compounds having the same molecular formula but different structures are known as isomers for ex: n-butane and iso-butane are isomers.

(b) Isomer of n-heptane: 2-methylhexane



(c) Butane

(d) (i) 2-methylpropane

(ii) 2-methylbutane

(iii) Propene

(iv) Propyne

Solution 39

(a) A compound made up of hydrogen and carbon only is called a hydrocarbon (Hydrogen + Carbon = Hydrocarbon). For example: methane (CH_4), ethane (C_2H_6), ethene (C_2H_4), and ethyne (C_2H_2), all are hydrocarbons as they are made up of only two elements: carbon and hydrogen.

(b) Saturated Hydrocarbons: These are the ones in which the carbon atoms are connected by only single bonds. They are also known as alkanes.

Example: Methane (CH_4) and ethane (C_2H_6)

Unsaturated Hydrocarbons: These are the ones in which two carbon atoms are connected by a double bond or a triple bond.

Example: Ethene (C_2H_4) and ethyne (C_2H_2)

(c) Saturated cyclic hydrocarbon: Cyclohexane, C_6H_{12}

Unsaturated cyclic hydrocarbon: Benzene, C_6H_6

(d) Hexane, C_6H_{14}

(e) (i) None (ii) Two (iii) Three (iv) Five

***** END *****