7. World of Carbon (Answer Key)

DATE / /

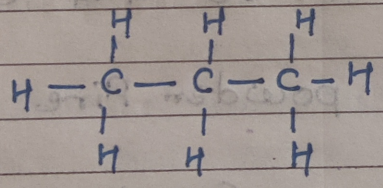
Q.1) MCQ.

1) c) Charcoal
2) b) Diamond
3) a) Graphite
4) c) Fullerene
5) a) CO
6) c) CO_2
7) c) $Na_2CO_3 \cdot 10H_2O$
8) c) 4
9) d) 4

Q.2)

1) Catenation is the ability of atoms of an element to combine among themselves. the ability of Carbon for catenation is very high.

e.g.



2) Different forms of same element having different physical properties but with same chemical properties are known as Allotropes and this phenomenon is called Allotropy.

3) Carbon has three allotropes and they are as follows:-

1) Diamond

2) Graphite
3) Fullerene

4) two characteristics of diamond:-
1) Diamond is very hard and Transparent.
2) Diamond is non-conductor of electricity

5) two uses of diamond:-
1) It is used to make ornaments.
2) It is used for cutting glass.

6) Pure diamonds are chemically and structurally colourless. But there is presence of certain elements imparts colour to ~~imp~~ diamond is called coloured diamond.
e.g Presence of Boron imparts blue colour to the diamond.

7) two characteristics of Graphite:-
1) Soft and slippery.
2) It is Grey in colour.

8) two uses of Graphite
1) It is use to make pencil lead.
2) used to make electrodes of dry cell.

9) Fullerene is a hollow structure consisting of pentagons and hexagons. They are known as bulky balls.

10) Some uses of CO_2 :-
1) used in fire extinguishers.
2) used to make soda water or soft drinks.
3) used to manufacture washing soda and baking soda.

Q.3)

1) Diamond	Graphite
1. It is very hard.	1. It is very soft.
2. It is non-conductor of electricity.	2. It is conductor of electricity.
3. It is transparent.	3. It is not transparent.
4. It is colourless.	4. It is Grey in colour.
5. It has cubic crystal structure	5. It has a planar structure.

2) Graphite is the softest crystalline allotrope of Carbon.
Uses of Graphite :-
1) It is soft and slippery.
2) Grey in colour.

3) It is Conductor of electricity.
4) and It is non-volatile.

Characteristics of Graphite:-
1) Graphite is used to make pencil lead.
2) It is used to make electrodes of dry cell.
3) used as solid lubricant.

3)

'A'		Answers
1) Diamond	–	Non electric Conductor
2) Graphite	–	Soft and Grey
3) CO	–	fuel
4) CO_2	–	Green house effect

4) Green house effect is the process of increasing atmospheric temperature due to the increase in amount of CO_2 in the atmosphere.

As a result of Green house effect, the average temperature of the earth and the atmosphere increases, This is known as Global Warming.

Global warming causes due to increase in pollution and Increase in amount of CO_2.

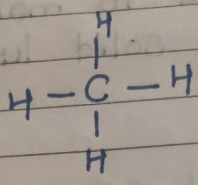
5) Covalent bond is a bond formed when electrons are get shared by both the atoms.

e.g H_2 H—H

Covalent bond is of three types:-
1) Single bond
2) Double bond
3) Triple bond.

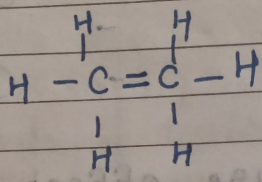
Carbon has 4 electrons in its outermost shell, so has valency 4. and hence it shows tendency to form covalent bonding.

Single bond :-



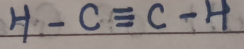
Methane

Double bond :-



Ethane

Triple bond :-



Ethyne

Q. 4)

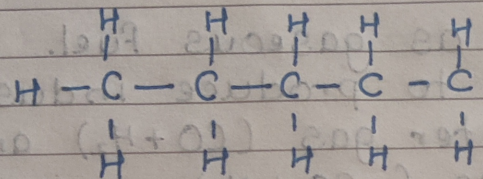
→ 1) 1) In Graphite, each carbon atom is covalently bonded with 3 surrounding carbon atom & forms sheet like structure. These sheet like layer stalked over one another. This layers are held together by weak van der waal's forces. Hence one layer can slide over other.

2) The presence of free electrons which are

not involved in bonding make graphite a conductor of electricity. While In case of diamond there are no free electrons, hence Diamond is non-conductor of electricity.

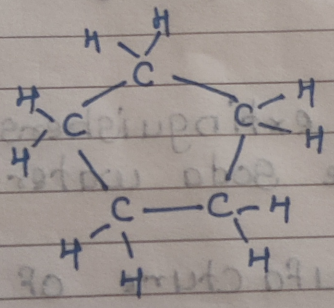
→ 2)

Straight Chain structure of 5 Carbon atoms.



(Pentane)

Ring Chain Structure of 5 Carbon atoms:-



(cyclopentane)

→ 3)

Chemical formula of Calcium Carbonate :- $CaCO_3$

Chemical formula of Baking Soda :- $NaHCO_3$

i) $CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2O + CO_2$

When Calcium Carbonate reacts with acid, CO_2 gas gets evolved.

ii) $NaHCO_3 + HCl \longrightarrow NaCl + H_2O + CO_2 \uparrow$

When Baking Soda reacts with acid, Carbon dioxide gas evolved.

→ 4) Uses of CO :-

1) It is used as gaseous fuel.
2) It is used to produce industrial gases like water gas ($CO + H_2$) and producer gas ($CO + N_2$)
3) used as reducing agent in metallurgy.

Uses of CO_2 :-

1) used in fire extinguishers.
2) used to make Soda water and Soft drinks.
3) used in manufacture of washing Soda and baking soda.
4) used to make Urea.

→ 5) Dry powder fire extinguisher :-

A Chemical which is known as ABC is used in this device. It is a mixture of monoammonium phosphate and ammonium Sulphate).

This powder when sprayed on burning substance, get melts and creates a covering on burning substance and Stops further burning.

6) 1) Graphenes are two dimensional sheets of hexagonal rings formed by Carbon.
2) Graphenes resemble single layer of Graphite
3) Graphenes are two hundred times stronger than steel.
4) It is conductor of heat as well as electricity.
5) Graphene has a material that has revolutionized in field of nanotechnology.