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**MAT NO: 19/MHS11/052
CHEM 102 ASSIGNMENT
ON INORGANIC
CHEMISTRY**

1, Question

**Diamond and Graphite
are covalent crystals,
compare their properties.**

DIAMOND

GRAPHITE

1, very hard, hardest substance	Soft and slippery
2, Good insulator	Good conductors due to mobile π electrons
3, tetrahedral bond in all directions	Layer structure with fused rings

4, density 3.51	Density 2.22
5, strong covalent force	Van der wal force
6, melting point of 3930c	Melting point of 3000c
7, sp ³ with II electrons	Ssp ² hybridized with II electrons
8, jewelry, cutting or glass	Lubricants, conducting, electrodes and lead pencil.

2,

There are three types of binary hydride, write short note on them.

They are: Ionic hydrides, covalent hydrides and interstitial hydrides

Ionic hydrides are formed when molecular H₂ react with alkali and alkali earth

metals. These halides are solids with high melting point temperatures. The halides are strong bronzed bases that accept protons from donors like water. $2\text{Li} + \text{H}_2 \rightarrow 2\text{LiH}$

Covalent hydrides are formed when elements in Groups 3A to 7A.

Examples include CH_4 , HCl , PH_3 some are polymeric like boranes, silanes and hydrocarbons.

Interstitial

hydrides (metallic hydrides) are the non-stoichiometric hydrides usually formed with transitional metals like iron, vanadium, nickel etc.

The molecular hydrogen dissolves into metals only to be released on heating.

Crystals can be classified into ionic, covalent

molecular and metallic

Ionic crystals Covalent crystals Molecular crystals

Metallic crystals

They are composed of charged species and constitutes of different sizes of anions and cations. The atoms are held in an extensive three dimensional network entirely by covalent bond. The lattice are occupied by molecules rather than atoms held by intermolecular forces. The lattice points are occupied of atoms of the same metals held by metallic bonds.

They have high melting points. They have high melting points. They have low melting points. They have high melting points. They conduct electricity in molten or aqueous state. They do not conduct electricity cause they are made up of atoms. They are poor electrical conductors. They are good

electrical conductor due to mobility of delocalized electrons

Write short notes on the similarities and differences between group 5, 6 and 7 on the periodic table.

SIMILARITIES

i). Nitrogen and oxygen which are in group 5 and 6 respectively are both colorless, odorless, diatomic gases which comprise the principal constituents of the atmosphere and they differ strikingly from the following elements in each of their groups.

ii). They are electronegative

iii). They are non-metallic solids which occur in several allotropic modifications and they readily burn in air.

iv). They do not react with

air at room temperature

DIFFERENCES

i). They all have different valence electrons in their outermost shells

ii). The reactivity of the halogens (group 7) diminishes down the group, but although iodine is much less reactive than chlorine, bromine is a still very reactive element and combines directly with elements such as sulphur, phosphorus, iron and mercury

iv). Group 5 and 6 belongs to a class of transition metals while 7 belongs to halogen class.

Write short notes on the five classes on oxides

They are: Normal oxides, suboxides, peroxides and superoxides

i). Normal oxides contain E-m bonds but no E-E bonds. These bond may be ionic or covalent e.g.

CaO, CO₂. Normal oxides are far the most important and numerous classes. In them oxygen has an oxidation number of -2, E and oxidation number normal for its group.

ii). Suboxides contain E- E bonds as well as R - O bonds, but no O-O bonds, e.g. carbon suboxide (a gas), CaO₂.

iii). Peroxides contain O - O bonds as well as R - O bonds, but no E- E bonds eg H₂O₂, K₂O. The oxidation number of oxygen in peroxide is -1.

All peroxides gives hydrogen oxide when treated with water or dilute acids, They are therefore salts of hydrogen peroxide.

Peroxides are formed by all metals of group 1 and 2 except beryllium. They contain the ion (O₂)²⁻.

iv). Super peroxides are

related to peroxides. But contain the ion (O_2) in which oxygen has the oxidation number $-1/2$ its form superoxides, e.g.

KO_2