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Batch : 241

GSA (Mock - 5)

Q NO.02:

(a) What is octet rule in Chemical bonding? Explain Covalent bond in detail?

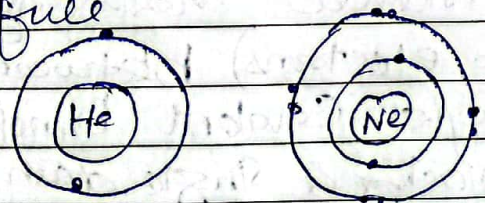
Ans: Chemical Bonding:

The force of attraction which hold the atoms together to form molecule or formula unit is called as Chemical Bonding.

Octet rule:

Atoms forms bonds with other atoms as to attain a noble gas stable electronic configuration and atoms tend to complete their valance shell so combine with each other to form molecule.

- ⇒ They follow "Octet rule" that is want to complete their valance shell by filling their "8 electrons"
- ⇒ Noble gases have stable electronic arrangement because their outer shells are full



He₂

Ne₂ = 2, 8

Covalent Bond:

American Chemist G.N Lewis in 1916 gave the idea of Covalent bonding

Definition: A bond which is formed by mutual sharing of electron between two atoms is called or "electron pair bond"

Explanation:

Covalent bond is formed between the same or different kind of atoms, which should have high electronegativity because such atoms do not lose electrons easily, they share their electron to complete their octet due to the reason they are also called

"Non-Metal - Non metal bond"

Example:

formation of H_2 , Cl_2 , HCl , O_2 , N_2 etc

Types of Covalent Bond:

on the basis of number of shared electron.

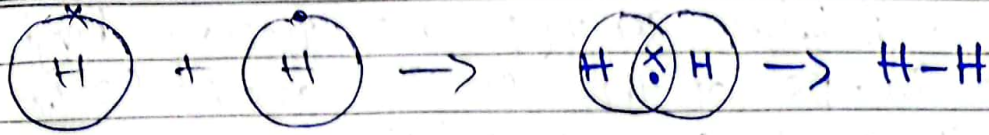
- 1) Single covalent bond
- 2) Double covalent bond
- 3) Triple covalent bond

1) Single Covalent Bond (Sigma bond)

A bond formed by mutual sharing of one electron pair (two electrons) between two atoms is called single covalent bond."

=> represented by placing a single dash (-) between two atoms

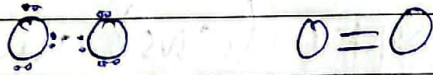
Example: $H-H$ (forms a single hydrogen bond in the diatomic hydrogen atom)



2) Double Covalent Bond:

"A bond formed by mutual sharing of two electron pair (4 electron) between two atoms"
 => represented by putting two lines (dash) (=) btw two atoms.

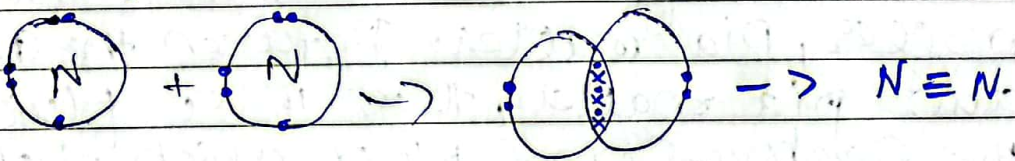
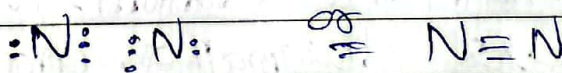
Example: oxygen molecule



3) Triple Covalent Bond:

"A bond formed by mutual sharing of 3 electron pair (6 electron) between two atoms is called as triple covalent bond."
 represented by putting 3 dash (\equiv) between two atoms

Example: N_2 , ethyne



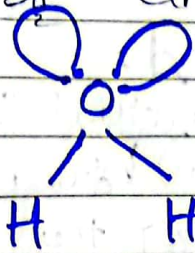
two Nitrogen atom (2,5)

Nitrogen molecule

2) why water molecules are angular in structure?

The shape of water molecule is angular due to the presence of two lone pairs on the oxygen atom.

As repulsion among lone pairs is highest the shape of the water molecule become V-shaped or angular.



Angular structure of water.

(c) write a note on cell/structure and function of human brain?

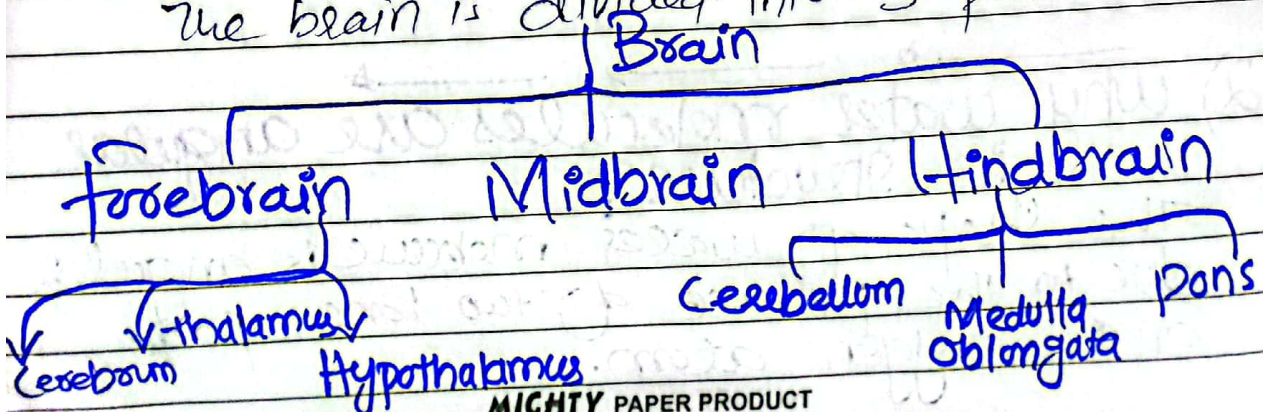
The human nervous system (CNS) and peripheral nervous system (PNS). The CNS have central location.

(CNS) It consist of brain and Spinal Cord and both are hollow. The brain and spinal cord are covered with three protective membranes called meninges

Structure of Brain

It is enclosed within the cranium. The three meninges are dura mater, arachnoid matter, pia matter. Between the arachnoid and pia matter, there is a fluid, the Cerebro-Spinal fluid, which helps to cushion the brain from shock.

The brain is divided into 3 parts



1) Cerebrum:

largest part of the ^{human} brain. The surface of the cerebrum is called cerebral cortex containing 10 billion neurons.

(a) Functions of Cerebrum:

Cerebrum associated with higher brain function such as thought and action. The cerebral cortex is divided into four sections called "lobes": The frontal lobe, parietal lobe, occipital and temporal lobe. Different lobes have different functions.

(b) Functions of Thalamus:

Receive message from five senses and send it to limbic system.

(c) Hypothalamus:

Control pulse, thirst, appetite, sleep pattern etc also called pleasure and thirst center, also controls hormone production.

(d) Cerebellum:

Control balance, movement, bodily posture and coordination among body parts.

(e) Midbrain:

Master coordinator and acts as a bridge and also called relay center.

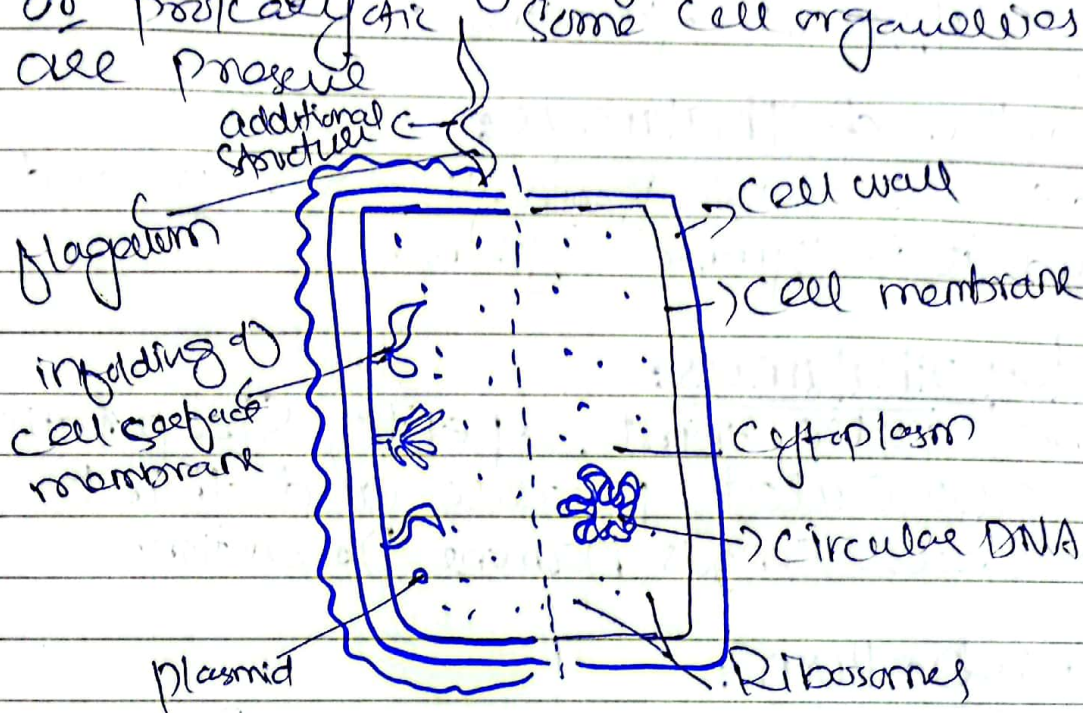
(f) Medulla: It function as involuntary. It performs various tasks including regulating blood pressure and breathing.

(d) Describe Cell Structure, write down the function of at least 3 subcellular organelles.

Cell Structure

Cell is the unit of structure and functions of all living things. The cells that make up our body are small that one can not see a single cell with a naked eye.

⇒ In every living organism whether eukaryotic or prokaryotic some cell organelles are present.



① Mitochondria: power house of cell

Functions (i) Imp metabolic process take place these are Krebs cycle, aerobic respiration, fatty acid metabolism etc.

② Plasma Membrane:

or cell membrane is the outermost boundary of cell.

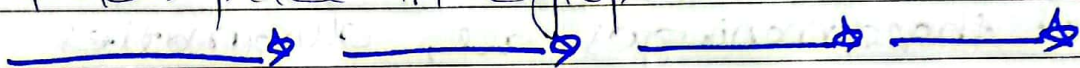
Functions (i): Transport of materials is an important function.

(2) Differentially permeable membrane: It allows only selective substance to pass through it.

(3) Cytoplasm: The living content of Protoplasm between plasma membrane and nucleus is Cytoplasm.

functions:

- 1) It acts as a storage house
- 2) Some metabolic process like glycolysis takes place in cytoplasm.



Q NO 03: (a) what is polio, what are the causes and differentiate btw IPV and OPV?

Ans: Poliomyelitis (polio) is a highly infectious viral disease, which mainly affects young children.

It is caused by polio RNA viruses

Polio Vaccines:

two types of vaccine that protects against polio: Inactivated polio vaccine (IPV) and oral polio vaccine (OPV)

IPV

OPV

IPV is given as an injection in the leg or arm, depending on ages.

OPV is taken by mouth.

(b) Name two parts of N.S? Briefly describe CNS. Describe Alzheimer Disease.

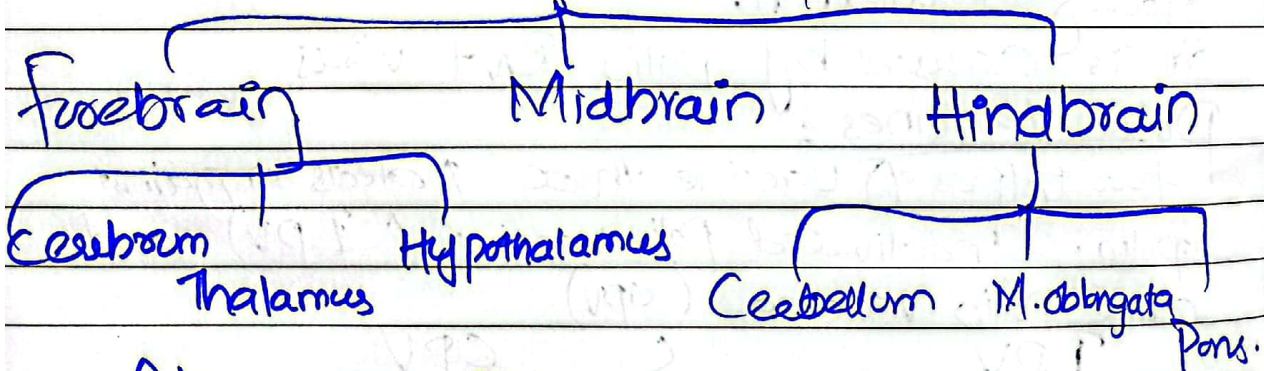
The human nervous system is divided into parts (CNS) Central Nervous System and (PNS) peripheral nervous system.

(CNS) Central Nervous System:

It consist of brain and spinal cord and both are hollow. The brain and spinal cords are covered with three protective layers called meninges

Brain: It is enclosed within the cranium.

The three meninges are, duramatter (next to the bone of cranium), arachnoid matter (middle membrane), pia matter next to the nervous tissues, btw arachnoid and pia matter there is a fluid, the Cerebro-spinal fluid, which helps to cushion the brain from shock. The brain is divided into 3 parts:



Alzheimers Disease:

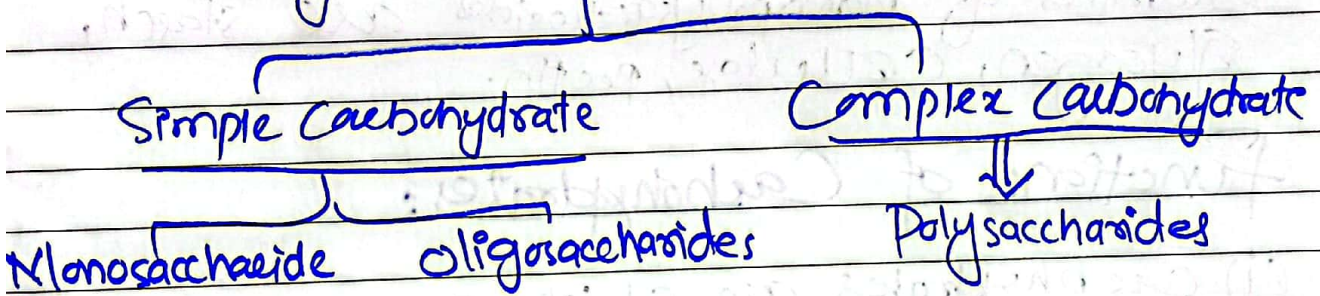
Mental deterioration usually strikes late in life

(C) Carbohydrates are the major source of energy for the cells. Describe their structure, function and classification.

Carbohydrates:

Carbohydrates are the human body's key source of energy, providing 3.9 calories of energy per gram. When carbohydrates are broken down by the body, glucose is produced. Carbohydrates are organic compounds that comprise of only carbon, hydrogen, and oxygen. The Hydrogen: oxygen ratio is usually 2:1

Carbohydrate Classification:



Monosaccharides:

from Greek mono = one and sakkaron = sugar. They are often called simple sugars. They are simplest sugar because they can not be hydrolyzed.

General formula is $C_n(H_2O)_n$

They are further classified into trioses, tetroses, hexoses, heptoses etc.

Examples of monosaccharide are, glucose, fructose, ribulose.

2) Oligosaccharides :

In Greek oligo means few. Oligosaccharides are compound sugars that yield 2-10 molecules of the same or different monosaccharides.

The General formula of disaccharide is $C_n(H_2O)_{n-2}$
 Sucrose = Common table sugar = Glucose + fructose
 Lactose = major sugar in milk = Glucose + Galactose

3) Polysaccharides :

In Greek, poly means many. Polysaccharides are compound sugars and yield more than 10 molecules of monosaccharides on hydrolysis.

Their general formula is $(C_6H_{10}O_5)_n$.

Examples of homopolysaccharides are starch, glycogen, cellulose, pectin.

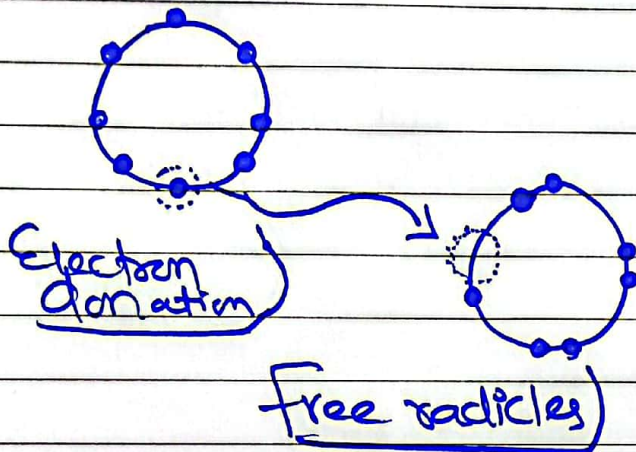
Functions of Carbohydrates:

- (i) Carbohydrates are chief energy sources, in many animals: they are instant source of energy.
- (ii) Glucose is stored as Glycogen in animals and starch in plants.
- (iii) Stored carbohydrates acts as energy source instead of protein.
- (iv) Carbohydrates are rich in fiber content help to prevent constipation.

(d) Discuss Importance of Antioxidants and preservatives in food?

Antioxidant Compound are one of the chief defence mechanisms used by the body to prevent free radical formation. They prevent or slow down cell damage by donating electron to these free radicals, in effect neutralizing the harmful chain reaction that free radicals can set off.

Antioxidants at work



these substance are used to prevent oxidation of fats by molecular oxygen
 * prevents fatty or oily food from becoming rancid.

⇒ Preservatives:

prevents or slow down the growth of bacterial or fungi, so that food can be kept longer

food preservation include different processes by heat, cold, Drying, Acid, Sugar and salt, Chemicals, Radiations, etc.

