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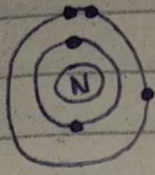
Part - II

Q3.

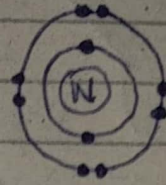
(i.) REASON WHY ATOMS FORM BONDS

Atoms are always seen forming bonds. The main reason behind it is that atoms want to achieve stability. They want to reach the lowest energy state. This is done by completing the octet rule i.e. having eight electrons in their outermost shells.

In order to complete eight electrons in the valence shells, atoms tend to form bonds with other atoms. This is done either by the complete transfer of electrons (ionic bond) or by the mutual sharing between the atoms (covalent bond).



Non-stable atom



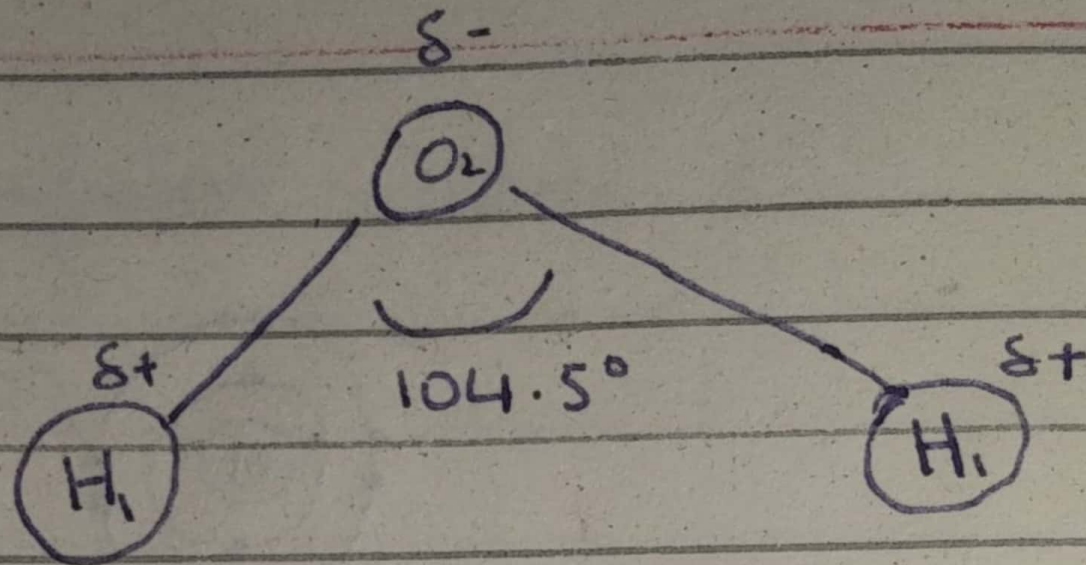
Stable atom

## COVALENT BOND IN A WATER MOLECULE

A water molecule is made up of two hydrogen atoms and one oxygen atom. None of the two atoms are stable, so to achieve stability, a bond must be formed. Hence, a covalent bond is formed by the mutual sharing of electrons between the two hydrogen and oxygen atoms.

There is difference in the energies of hydrogen and oxygen atoms. Oxygen has slightly more negative charge, and hydrogen has positive. This results in oxygen attracting the shared pair of electrons slightly more than hydrogen.

This difference in the attraction power gives the famous bent shape to water molecule. Partial negative and partial positive charges appear on oxygen atom and hydrogen atom respectively. The angle formed between the atoms is  $104.5^\circ$ . The shape of water molecule is angular.



Angular shaped Water Molecule.

## (ii.) DOPING:

The process of adding some impurity atoms in a pure semiconductor, in order to enhance its conductivity is known as doping.

Doping can be done in two ways:

1. N-type dopant or pentavalent dopant is added in an intrinsic semiconductor to form N-type semiconductors.

2. P-type dopant or trivalent dopant is added in a pure semiconductor to form P-type semiconductors.

## TYPES OF CERAMICS:

Ceramics are materials that are devoid of non-metallic and non-organic substance. They are typically made from clay and other raw substances.

They can be divided into several types based on their composition.

### 1. EARTHENWARE:

They are porous and low-fired ceramics. They are made waterproof.

Such type of ceramics are used in every-day pottery, and decorative items.

### 2. STONEWARE:

They are dense, non-porous and fired at higher temperatures than earthenware. Stoneware ceramics are used in dinner plates, mugs etc.

### 3. PORCELAIN:

They are highly refined, white and translucent ceramics fired at very extreme temperatures.

It is used in fine china, tiles and electrical insulators.

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### (iii) GLOBAL WARMING

Global warming is the long term increase in Earth's average temperature. It has impacts on various elements, and include both its merits and demerits.

#### 1. MERITS OF GLOBAL WARMING

Following are the merits of global warming.

##### a. ENHANCED AGRICULTURAL PRODUCTIVITY:

With the increase in global temperature, the warm season stretches in time. This results in longer growing season and increased agricultural goods / products.

##### b. ENERGY SAVINGS:

milder and short duration winters help in the reduction of heat energy consumption.

##### c. NEW SHIPPING ROUTES:

As the Arctic snow melts, new shipping routes are discovered. This leads to lower fuel consumption and shorter and better shipping routes.

#### d. TOURISM OPPORTUNITIES:

Traditionally colder regions tend to have longer summers and less terrible cold weathers, which results in a greater tourist influx.

#### a. DEMERITS OF GLOBAL WARMING

Following are the demerits of global warming.

##### 1. HIGH SEA-LEVELS:

As the snow melts, the sea levels rises causing threats to low-lying coastal countries. It also poses danger of floods.

##### b. HEALTH RISKS:

Due to high temperatures, risks to a healthy body increases. Heatstrokes, water-borne diseases doubles in their number.

##### c. EXTREME WEATHERS:

Due to high temperatures, rapid changes in the environment occurs. Weather patterns drastically change causing hurricanes, heatwaves and floods. The 2022 floods in Pakistan are the result of global warming.

#### d. BIODIVERSITY LOSS:

Increased temperatures disrupt the habitat of animals and plants. Forests catch fire resulting in loss of natural habitats of many living creatures.

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#### (iv.) POLIO

Polio is a viral disease caused by the virus. It affects the nerves in the spinal cord and the brain stem. It leads to paralysis where the patient cannot move certain limbs. It also causes breathing problems. In severe cases polio can also cause death. It is caused by three variants of poliovirus i.e. wild poliovirus type 1, 2 and 3. This viral disease is treatable by taking its vaccine. If vaccine is not taken, the concerned person can be attacked by the virus.

#### POLIO ERADICATION CHALLENGES IN PAKISTAN:

Polio virus has been eradicated from the whole world except for Pakistan and war-torn Afghanistan. Many hurdles are faced in Pakistan in the journey of eradicating this viral



disease from the country. The main reasons include the conservative mentality of people. People fears that vaccinating their children against the disease may pose potential threats to the future health of the child including the reproductive health. Another challenge is the poor health sector of Pakistan. Low immunisation process can also be linked to the poor infrastructure, making it difficult to reach to far-flung areas.

There are many challenges for wiping out the disease from Pakistan. The government must take measures to aware the masses about the importance of the immunization against polio virus.

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## (i) BILE:

### • DEFINITION:

Bile is a greenish-yellow secretion released from the liver. It is passed to the gall-bladder for storage and transportation to the concerned body organs.

### • COMPOSITION:

Bile juice is composed of 95% of water which has dissolved solid particles. These solid particles include bile salts, bilirubin, fats, fatty acids, cholesterol etc. It also includes inorganic salts and environmental toxins.

### • FUNCTIONS OF BILE:

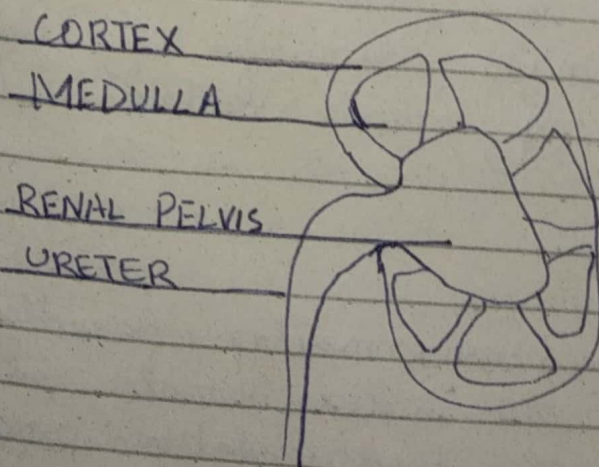
The functions of liver juice include:

- 1- It helps in digestion of fats.
  - 2- It breaks down large fatty molecules into smaller ones.
  3. It helps in digestion of proteins because of the presence of protein digesting enzymes.
  4. It also carries away the waste product.
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## (22) ROLE OF KIDNEY IN EXCRETION

The kidneys are excretory organs located in abdominal area. They two in number, located on each side. The basic role of kidney is the purification of blood. It removes waste products from the blood and excretes them out of the body in the form of urine.

Kidneys achieve this function of purifying the blood through its structural and functional unit Nephron. The nephron receives the filtered blood called filtrate and further processes it to absorb substances like glucose and salt. The excessive materials are turned into urine. The urine is then released out of the body through urethra.



STRUCTURE OF KIDNEY

### (iii) METHODS OF SOLID WASTE MANAGEMENT.

Solid Waste Management involves various methods to handle and dispose of solid waste materials.

Following are some of the effective methods:

#### 1. LANDFILLING:

In this method waste is buried in methodical ~~with~~ manner to prevent contamination of underground water supply system, minimize odour and gas emission.

#### 2. BURNING THE SOLID WASTE.

In this method, the waste is burned at high temperatures. In this way the volume is reduced and energy is produced. The Waste-to-Energy process helps in producing electricity from the mass burning of the huge dumps of waste material.

#### 3. RECYCLING:

One of the environmental friendly ways of managing the solid waste is the recycling of non-biodegradable products. For example; plastics, metals etc are separated from the dump and

sent to recycling centers where new products are manufactured from them.

#### 4. PYROLYSIS.

In this method the organic ~~method~~ waste is decomposed at high temperatures in the absence of oxygen. This process produces syngas, bio-oil and char.

Above are the methods mentioned for the useful management of waste materials.

(iv.)

### ANEMIA:

#### • DEFINITION:

It is a condition where the number of red blood cells or the hemoglobin level in the blood is below normal. This targets women and children mostly.

### APPENDICITIS:

#### • DEFINITION:

It is the inflammation of the appendix. It cause pain in lower right abdomen, where appendix is located. It can be caused by various infections in the digestive tract caused either by bacteria or virus.

## SPLEEN:

### • DEFINITION:

It is an organ that is part of the lymphatic & blood system.

It filters blood to get rid of microorganisms and old or damaged red blood cells. It also makes WBCs and stores blood cells.

## MYOPIA:

### • DEFINITION:

It is a vision condition where objects close to the eye are seen clearly whereas those ~~seen~~ farthest away are not seen clearly.

It can be corrected by using spectacles or contact lenses. A concave lens corrects myopia.

## ISOTONES:

### • DEFINITION:

Isotones are those species of atoms that have the same number of neutrons in the nuclei of the respective atoms.

For example:

Calcium-37 and Potassium-39 have the same number of neutrons i.e. 20. So both  $\text{Ca-37}$  and  $\text{K-39}$  are isotones.

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### PART - III

Q7

i. To find the volume of the cylinder:

$$V = \pi r^2 h$$

Solution:

$$V = \pi r^2 h$$

$$= 3.14 (30)^2 (100) \quad \boxed{1 \text{ m} = 100 \text{ cm}}$$

$$= 3.14 (900) \times (100)$$

$$= 3.14 \times 90,000 \text{ cm}^3$$

$$V = 282,743 \text{ cm}^3$$

Ans.

ii. Solution:

1- Let the ages of the three boys be  $3x$ ,  $5x$ , and  $7x$ .

2- The average age of the three boys is 15 years. Therefore, the sum of their ages divided by 3 equals 15

$$\Rightarrow \frac{3x + 5x + 7x}{3} = 15$$

$$\Rightarrow \frac{5}{3}x = 15$$

$$\Rightarrow 5x = 15$$

$$\Rightarrow x = \frac{15}{5}$$

$$\Rightarrow x = 3$$

Now, finding the age of the youngest boy which is  $3x$ .

$$\Rightarrow 3 \times 3 = 9 \quad \boxed{\text{Since } x = 3}$$

So, the age of the youngest boy is 9 years.

Ans.

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