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PART II

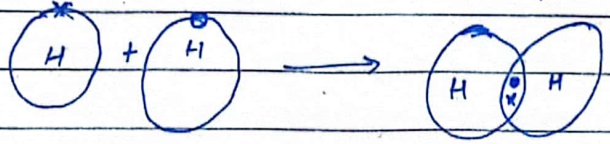
SECTION I

Q.3) Why atoms form chemical bonds? Discuss covalent bond in water molecule.

Ans:. Every system in Universe tends to lower its energy, in order to attain stability, water flows from higher concentration to lower concentration. Similarly electricity flows from higher to lower potential and heat flows from a hot body to a cold body. Why is it so? This happens because both water and electricity try to decrease their energy. The Energy of the isolated hydrogen atom is higher than the two bonded hydrogen atoms. That is the combination of atoms gives stable molecule through emission of energy. They can decrease their energy by combining with other atoms and form a chemical bond.

Covalent bond: A covalent bond is formed when two atoms are joined together by the sharing of electrons pair. The shared pair of electron is represented by a dash (–) between two bonded atoms. The shared pair of electron remains between the two bonded atoms and are called localized electron.

H-1



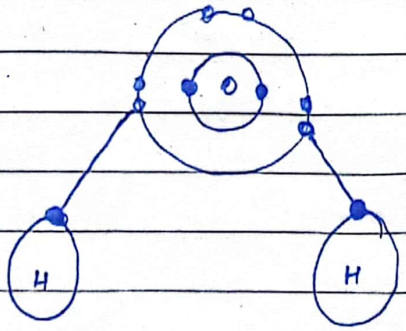
(Formation of covalent bond.

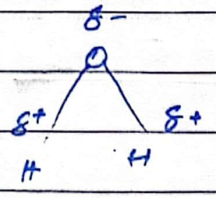
Covalent bond may be single, double or triple covalent bond formed by the sharing of one, two

or three electrons pair.

Covalent bond in water molecules:-

A water molecule form covalent bond between one oxygen and two hydrogen atoms. Each hydrogen atom shares one electron with the oxygen atom, resulting in two single covalent bonds. Oxygen which has six electrons in its outermost shell requires two additional electrons to ~~otta~~ complete eight electrons in outermost shell. similarly each hydrogen atoms need one electron to complete its outermost shell. This arrangement of electrons result in bent shape between the hydrogen atoms making the molecule polar.





(b) - what is Doping? Discuss different types of ceramics?

DOPING:- it is the introduction of impurities into an intrinsic semiconductor material to modify its electrical properties. This process is used to increase the number of charge carriers within the semiconductor. There are two types of doping. n-type and p-type. In n-type doping elements with more valence electron than the semiconductor like phosphorus or arsenic

are added which provides extra electrons and increase negative charge carriers. In p-type doping, elements with fewer valence electrons like boron or gallium are added creating 'holes' or positive charge carriers. This controlled alteration of electrical properties is risky for normal functioning of electronic devices like diodes and transistors.

(b) ceramics: A ceramic is a non metallic solid made up of clay that have been shaped and then hardened by heating to high temperature. it includes materials like bricks plates etc.

Types of ceramics based on application:-

- Traditional ceramics
  - They are primarily made of clay based materials.
  - white wares
  - structural clay products.
  - Brick and Tiles
  - Abrasives
  - Refractories
  - cement
- Advanced ceramics → Non-clay based materials.
  - Electroceramics
    - Electronic ceramics
    - capacitors
    - Dielectric
    - piezoelectric ceramics
    - Magnetic ceramics
    - optical ceramics
    - conductive ceramics.
  - Advanced structured ceramics.
    - Nuclear ceramics
    - Bioceramics
    - Tribological (wear resistant ceramics)
    - Automotive ceramics.

(c) state some of the merit and Demerits of Global warming.

Global warming: Global warming is the rise in the average temperature of the earth's

Atmosphere. it is one of the most important environmental issues. There is a direct relationship between the average level of CO_2 in the atmosphere and the average global temperature.

merits of Global warming:

Some merits of Global warming are,

(1) It makes the Growing season longer for certain crops allowing for multiple harvests in some regions.

(2) Areas which were previously too cold for Agriculture may become suitable for farming.

(3) Milder winters can lead to lower heating costs for households and business activities in colder regions reducing energy consumption and expenses.

(4) Higher level of CO_2 can stimulate plant growth, which may increase crop yields and biomass production in certain areas.

Demerits of Global warming:

(1) it increases average global temperature. causing heatwaves and extreme weather events.

(2) High temperatures cause polar ice caps and glaciers to melt contributing to rise sea level.

(3) it can alter weather patterns which can lead to more intense and frequent storms, drought and change in rainfall distribution. impacting water supply and agriculture.

(4) Global warming can affect marine life due to increase in acidification.

(5) Global warming can affect biodiversity. changes in climate and habitat loss can threaten species with extinction and disrupt ecosystem.

d). What is polio? what are challenges in eradication of Polio in Pakistan.

Ans:- Polio: polio or poliomyelitis is a highly infectious viral disease which mainly effect childrens. it is caused by polioviruses. The virus spreads directly from person to Person contact, by contact with infected mucous or phlegm from the nose or mouth or by contact with infected person feaces. The virus enters through the mouth and nose and multiplies in the throat and intestinal tract and then is absorbed and spread through the blood and lymph system. The time from being infected with the virus to developing symptoms of disease, incubation period ranges from 5 - 35 days (Average 7 - 14 days).

challenges for pakistan in polio evadication.

(1) security issues:- polio evadication efforts are less in areas affected by conflict like afghan border area. many numerous attacks had been ~~happ~~ did on polio vaccination teams leading to deaths and injuries. mainly it difficult to reach every child.

(2) Misinformation and mistrust

Misinformation about the polio vaccine including false statements that it causes infertility or other health issues leads to resistance amongst communities. some peoples in communities believes that the polio vaccine is against their culture and religious practice and stopping the way of vaccination.

(3) Pakistan diverse geography including remote and

mountain areas make it difficult to reach to every child with vaccine.

(4) Limited healthcare infrastructure means the routine immunization is low and there is insufficient resources to support polio vaccination.

(5) Political instability can changes the priority of polio vaccination which can effect the continuity of vaccination.

(6) Funding issues can also effect the polio wild eradication program in pakistan.

Q:4:a) write a note on "Bile"?

ans:- Bile:- The liver produces bile which emulsifies fats and break them into droplets. Bile is stored in gall bladder composed of bile salts, bilrubin, cholesterol, phospholipids, electrolytes and water. Bile plays important role in digestion and absorption of fats. When food especially fatty acids enters small intestine, the gall bladder release bile into duodenum. The bile juice emulsifies large fat molecules into smaller droplets. significantly enhancing the action of digestive enzymes it also facilitates the absorption of fat soluble vitamins (A, D, E, K). Additionally Bile serves as a pathway for the excretion of bilirubin and excess cholesterol from the body. it also neutralizes stomach acid entering the small intestine, creating an optimal PH environment for intestinal enzymes to function. However, issues such as gall stones which form from bile components and conditions like jaundice resulting from excessive bilirubin can indicate

problems with ~~hemoglobin~~ bile production or flow, impairing overall health and digestion.

(b) Describe role of kidney in excretion

Ans: Kidneys plays an important role in excretion process by filtering wastes products and excess substances from blood. This process consist of three steps.

(1) Pressure filtration
(2) Reabsorption
(3) Tubular secretion.

(1) Pressure filtration: A renal artery carries the blood into kidneys. The artery divides to many arterioles which are further divided into capillaries of the glomerulous. When the blood reaches the glomerulous a lot of materials like water, salts, sugar and nitrogenous wastes are filtered out into the Bowman's capsule due to high pressure. and is called pressure filtration. The filtered materials in the glomerulus is called filtrate. Blood cells and plasma proteins are not filtered out because of their large size.

(2) Reabsorption:- The glomerular filtrate move to the next part of the nephron i.e renal tubule which is surrounded by blood capillaries. The useful constituents of the glumerular filtrate are reabsorbed into blood capillaries. some water and most of glucose is reabsorbed from the proximal convoluted tubule. salt are reabsorbed from the loop of Henle. while most of the water is reabsorbed from the distal convoluted tubule and collecting duct.

(3) Tubular secretions: When useful materials are absorbed from glumerular filtrate into blood. some waste materials (salts, hydrogen ions, urea etc) are again added from the blood capillaries to the renal tubule this step is called tubular secretion.

After passing the above three steps. The filtrate present in renal tubule is called urine which moves from collecting ducts to renal pelvis. From where it moves to urinary bladder via ureter. Here it is stored when the urinary bladder is filled with urine the urine is passed out through urethra.

(c) Discuss the different methods of solid waste management.

Ans:- Solid waste management involves the collection, Treatment and disposal of solid waste materials that are discarded as useless or unwanted. Effective management is essential for environmental sustainability, public health and economic efficiency. Certain methods are.

(1) Landfills: These are designated sites for waste where the waste is burried. This is the most common method of wastes disposal in many parts of the world. In this method the waste is spread in layers, compacted and covered with soil. modern landfills are designed with liners and systems to collect liquid and gas emission. landfills is a low cost activity and can handle larger volume of wastes.

(2) **Incineration:** it involves burning wastes at high temperatures to reduce its volume and mass. In incineration the waste is fed into a furnace or incinerator where it is combusted. The heat generated can be used to produce electricity or heat. The advantage of this method is significant volume reduction of waste, energy recovery and reduction of hazardous wastes. Disadvantage is ~~they~~ costly, cause air pollution and ash disposal issues.

(3) **Recycling:** Recycling involves converting waste materials into new products to prevent the waste of potentially useful materials. This process includes collection, sorting, cleaning, and processing of recyclable materials like paper, glass, metals and plastics. The advantage of this method is reducing pollution, and saves energy. Disadvantage is it requires proper segregation of wastes and not all materials are economically recyclable.

other methods include

(4) composting

(5) Anaerobic digestion.

(6) mechanical biological Treatment (MBT)

(7) waste to energy (WTE).

d) Define the terms.

(1) **Anaemia:** the deficiency of red blood cells or haemoglobin in the blood leading to reduced oxygen carrying capacity is called anaemia.

(e) Appendicitis: it is the inflammation of appendix presents with abdominal pain that starts near the belly button and moves to the lower right side. Appendicitis often requires surgical removal to prevent complications and rupture.

(f) Spleen: it is an organ located in the left upper part of abdomen under the ribcage. it plays important role in filtering blood, storing healthy RBCs and platelets and helping the immune system by removing old or damaged cells. and producing certain types of WBCs.

(g) Myopia: Also called near sightedness. is a refractive error of eye where close objects can be seen clearly but distant objects appear blurry it occures when the eyeball is to longer or the cornea is too Curved causing light rays to focus in front of the retina instead of directly on it.

(h) Isotones: Isotones are atoms of different elements that have the same number of neutron, but different numbers of protons, resulting in different atomic numbers and chemical properties.

SECTION II

Q16 a) in a bag, There are certain number of toy blocks with Alphabets A, B, C, D. The ratio of Block A : B : C : D is 4 : 7 : 3 : 1. if 'A' block is 50 more than the number of C block, what is the number of B. Block

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Sol: Let the number of Blocks for A, B, C and D be represented by $4x$, $7x$, $3x$, x. where x is common multiplier for the ratio.

Given

$4x = 3x + 50$

To find x

$4x - 3x = 50$

$x = 50$.

Now

$A = 4x = 4 \times 50 = 200$

$B = 7x = 7 \times 50 = 350$

$C = 3x = 3 \times 50 = 150$

Therefore the number of B Block is 350

(b) A pair of shoe originally cost is 80$. if there is a 15% discount and 10% sale tax applied. what is the final price?

Sol: To calculate the discounted price. which is 15%.

Discounted price = original price - (Original price x Discount%)

DP $\Rightarrow 80 - (80 \times 0.15)$

$\Rightarrow 80 - 12 = 68$.

(3) calculate the final price including sales tax.

Final price = Discounted price + (DP x Tax%)

$\Rightarrow 68 + (68 \times 0.10)$

$\Rightarrow 68 + 6.8 \Rightarrow 74.8$.

Therefore the final price of the pair of shoe after applying a 15% discount and a 10% sales tax is 74.8 dollars.

c) A Train Travels 42 km b/w two stops at average of 56 km/h. if Train departs at 4pm. when does the Train arrive?

Sol: to find out when the Train arrives at its distination, we need to calculate the time it takes for Train to Travel the 42 km distance at an average speed of 36 km/hr.

First, lets calculate the time taken to Travel 42km.

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{42\text{km}}{36\text{km/h}} \Rightarrow 1.1667\text{ h}$$

Converting This time into minutes

Time in min = $1.1667 \times 60 = 70$ mints.

Now add this time to departure time of 4:00pm

Arrival time = departure Time + time taken

→ Convert 4:00 pm into mins.

Departure time in minutes = $4 \times 60 = 240$ mints.

→ Now Add the time Taken (70 mints) to the departure time.

Arrival time in min = $240 + 70 = 310$ mints

Convert 310 min back into hours.

$$\text{Hours} = \frac{310}{60} = 5$$

$$\text{minutes} = 310 \bmod 60 = 10$$

Therefore the train arrives at 5:10 pm.

d) Arrange the jumble words.

① Terinsuperted.

Superintendent

② nwet;

white.

Q:7a) Find volume of cylinder with radius 30cm width = 1m.

Formula

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

where

$V \rightarrow$ volume

$r \rightarrow$ radius

$h \rightarrow$ height

Given Data

$R = 30\ cm.$

$h = 1m = 100\ cm$ $\quad \because 1m = 100\ cm$

put values in formula

$V = \pi \times (30\ cm)^2 \times 100\ cm$

$V = \pi \times 900\ cm^2 \times 100\ cm$

$V = 90000\ \pi\ cm^3$

Hence the volume of cylinder is $90000\ \pi\ cm^3$

(b) _____ ?

To find the ages of boys, let's denote their ages as $3x, 5x, 7x$.

Average age of 3 boys is 15 years so

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

Simplify and solve for x.

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

$$5x = 15$$

$$x = 3$$

Now put 3 in the ages of boys.

Ages of youngest boy $= 3x = 3 \times 3 =$ 9 years

(c) _____ ?

(i) 8, 19, 52, 151, 447

it is the wrong number series and do not form simple arithmetic pattern.

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(M) 11, 13, 17, 19, 23, — .

it is prime number series.

11, 13, 17, 19, 23, 29

Next prime number after 23 is. 29.