Chemist Interview Questions And Answers Guide.

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Chemist Job Interview Preparation Guide.

Question # 1

What is Aliquot and Diluent?

Answer:-

Aliquot : It is a measured sub-volume of original sample
Diluent : Material with which sample is diluted

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Question # 2

What is the difference between Molarity and Normality?

Answer:-

Both techniques are used to the amount of chemical present in the solution. However they are almost similar but differs in
Molarity:
* Molarity is used to know the total amount of molecules in a 1 litre solution
* It is expressed as moles of a compound per litre of solution
Normality:
* Normality is used to know the total number of reactive units in 1 litre of solution
* It is expressed in equivalent per litre

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Question # 3

What is Valency?

Answer:-

A valency is a property of a groups or atoms, equal to the number of atoms of hydrogen that the group or atom could combine with or displace it in forming compounds.

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Question # 4

Explain the formula to calculate pH of a solution?

Answer:-

In order to calculate the pH of a solution you have to use the formula pH= -log [H+] or pH = -log [H3O+]

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Question # 5

What is molality?

Answer:-

Molality is the number of solute that is present in 1 kg of a solvent.

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Question # 6

Explain what is the metal used to extract copper from the solution of copper sulphate?

Answer:-

Fe or ferrous is the metal that is used to extract copper from the solution of copper sulphate.

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Question # 7

What is titration?

Answer:-

Titration is a process to determine the molarity of a base or an acid. In this process a reaction is carried out between the known volumes of a solution with a known concentration, against the known volume of a solution with an unknown concentration.

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Question # 8

What is the monomer of polyethene?

Answer:-

The monomer of polyethene is ethylene

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Question # 9

Explain what is buffer?

Answer:-

A buffer is an aqueous solution which has highly stable pH. It is a blend of a weak acid and its conjugate base or vice versa. On adding small amount of base or acid to buffer, its pH hardly changes.

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Question # 10

Explain why graphite rod is used in nuclear reactor?

Answer:-

Graphite rod is used in nuclear reactor to convert fast moving neutrons into thermal neutrons.

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Question # 11

Explain how buffer works?

Answer:-

In buffer when hydrogen ion is added, it will neutralized by the base in buffer. Hydroxide ion will be neutralized by the acid. On the overall pH of the buffer solution, these neutralization reactions will not show much effect.
While when you select an acid as a buffer solution, try to use an acid acid that has a pH closed to your desired pH. This will help your buffer to achieve nearly equivalent amount of acid and conjugate base, so that it will enable to neutralize as much as H+ and OH -.

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Question # 12

What is oxidation and reduction reaction?

Answer:-

Oxidation = When there is a loss of hydrogen or electrons, OR gain of oxygen is known as Oxidation reaction.
Reduction = When there is a gain of hydrogen or electron OR loss of oxygen is known as reduction reaction
Example of oxidation-reduction reaction is observed in human body, when an electron is transferred into the cell and oxidation of glucose take place from which we get the energy.

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Question # 13

Explain what is mole?

Answer:-

Mole is the unit used to define the number of chemical substance present in a substance. It is the amount of substance which consists of the same number of chemical units as there are atoms in exactly 12 gram of pure carbon-12.

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Question # 14

What is dextro-rotatory and levo-rotatory?

Answer:-

Levorotation and Dextrorotation is referred to the properties of plane polarized light, when light rotates clockwise when it approaches the observer is then known as dextro-rotation and when the light rotates anti-clockwise then it is referred as levo-rotation.
A compound which exhibits a dextro-rotation is referred as dextro-rotatory and which exhibits levo-rotation is referred as levo-rotatory.

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Question # 15

How to calculate how many moles of glucose present in 320 mL of 5.0 M of glucose solution?

Answer:-

First step: Convert the volume from millilitres to litres
320 X (1 litre/1000mL) = 0.320 L solution
Second use the formula = M x V
= 5.0 moles glucose/ litre solution X 0.320 L solution

= 1.6 moles of glucose present in 320mL of solution

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Question # 16

How many moles of HCl are present in .70 L of a .33 M HCl?

Answer:-

* First, remember definition of M (moles), M = moles of species / L.
0.33 M = 0.33 moles HCl / L
* Then, multiple your volume by the molar concentration:
0.33 moles HCl / L x 0.70 L = 0.231 moles HCl
It is helpful to carry the units with your calculations. That way you can check that numerators and denominators cancel to give you the units of your answer.

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Question # 17

What is the difference between fractionation and distillation?

Answer:-

Both methods are used to separate the components present in the solution based on the melting points
* Distillation : This technique is used when boiling point of chemicals are different in the mixtures
* Fractionation : This technique is used when boiling point of chemicals are close to each other in the mixtures

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Question # 18

Explain what is the IUPAC name of benzene?

Answer:-

The IUPAC name for Benzene is Benzene. It forms the basis for other IUPAC-named benzene derivatives like 1, 2-dimethylbenzene etc.

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Question # 19

What is Avogadro's law?

Answer:-

According to Avogadro's law, at same temperature and pressure equal volume of gases contains the same number or molecules regardless of the chemical nature and physical properties.

Avogadro's number = 6.023 X 10 (-23)

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Question # 20

How to extract ephedrine from a mineral block?

Answer:-

You cannot extract ephedrine or pseudo ephedrine from a mineral block. Anyone who tells you that they have done it is either mistaken or a liar.

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Question # 21

Explain what makes a molecule into organic molecule?

Answer:-

In a molecule when hydrogen atom is less than the ratio of carbon atom, then such molecules are referred as an organic molecule.

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Question # 22

What is the organic structure of cetearyl alcohol and tell me what organic family it is?

Answer:-

Cetearyl alcohol is actually a mixture of both stearyl alcohol and cetyl alcohol (refer to links below for structures). Both of these compounds would be considered "fatty alcohols" due to their long carbon chains. Fatty alcohols are in the aliphatic hydrocarbon family. To draw the structure of "cetearyl alcohol" you would actually have to draw the structure of cetyl alcohol and the structure of stearyl alcohol.

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Question # 23

What is the chemical composition of fat in human body?

Answer:-

Fat found in human body is mainly composed of
* Glycerides
* Glycerides+Phospholipids
* Glycolipids
* Phosphoinotisides

* Tocopherol

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Question # 24

What is organic chemistry

Answer:-

Organic Chemistry is the chemistry of the compounds of carbon along with other elements such as are found in living organisms and elsewhere.

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Question # 25

Explain what are 3 facts on evaporation?

Answer:-

1. 80% of evaporation comes from the ocean.
2. 20% of evaporation comes from inland water.
3. Wind helps evaporation by moving it

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Question # 26

What is the formula you will use to calculate how many millilitres of 5.5 M NaOH are required to prepare 400 mL of 1.5M NaOH?

Answer:-

To know the amount or volume of NaOH to prepare 400 mL of 1.5 M NaOH, we use formula
M1 X V1 = M2 X V2
V1 = M2 X V2/ M1
But before that we will convert 400 mL into litre = 0.4 L
5.5 X V1 = 1.5 M x 0.4 L
V1 = 1.5 M X 0.4L/ 5.5
V1= 0.10 L
V1 = 100mL
So, you need 100mL of 5.5 NaOH

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Question # 27

What are the method for the preparation of 1 normal solution of hydrochloric acid?

Answer:-

Density of HCl: 1.48 g/ml
Molecular weight of HCl: 36.5g/mole
Concentration of HCl stock: 36%
Concentration of another HCl stock: 12N
Final volume: 1L
Let's assume that we're making a 1N HCl solution. Using the 36% concentration stock, we'll need to find out how many ml we would need. However, HCl is interesting because it has a higher density than water.
For a 1N solution (also known as 1M) however, you would need this amount of grams:
(1M HCl) x (36.5 g/ mole HCl) x (1L) = 36.5 grams.
Now we need the amount of ml from a 36% solution. This is different from having a known concentration like 10M, for example.
36% = 36 grams HCl / 100 grams of stock concentration solution
(36.5 grams HCl) x (100gram of stock solution/ 36 grams HCl) x (1 ml/ 1.48 grams) =
68.5ml
Dissolve 68.5ml of 36% solution into 931.5ml of ddH20.
If your stock concentration came in 12M, then using the following equation:
M = concentrations and V = volume.
M1V1 = M2V2
V1 = (M2V2)/M1
Using the second equation,
V1 = volume of your stock concentration
M1 = concentration of your stock
V2 = volume of your final preparation
M2 = concentration of your final
V1 = (1 M x 1L)/(12M) = 0.083 L = 83ml
Dissolve 83 mL of 12M HCl into 917ml of ddH2O

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Question # 28

how many millilitre is equal to 1 liter and how many microliter is equal to liter?

Answer:-

* 1 millilitre = 0.0001 liter
* 1 microliter = 0.0000001 liter

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Question # 29

Explain what makes a molecule into an organic molecule?

Answer:-

Any molecule that contains one or more atoms of Carbon is an organic molecule. All elements that are composed by Carbon are studied by Organic Chemistry.

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Question # 30

What is iron ore consists of?

Answer:-

Iron ore is consists of Fe2O3

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Question # 31

Explain why chemists have not created a periodic table of compounds?

Answer:-

One major reason I can think of, that has not been addressed yet, is the periodicity of the elements. You can line the elements up into neat functional groups--alkali metals, transition elements, halogens and so on. This you could not do with compounds, even if you had a separate table for hydrocarbons, one for elastomers, and one for dyestuffs... Compounds also find wide use as smaller blocks of larger compounds. We call these precursors. Take toluene. It is a very toxic compound, but if you compound it into toluene diisocyanate, then compound that into polyurethane, it becomes safe enough that you can build it into replacement hip joints. Chemists do keep books of compounds, but a table on a big sheet of paper the size of...oh, the entire side of a Wal-Mart store might be big enough? It could never happen.

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Question # 32

The nucleus of an atom consists of
A. electrons and neutrons
B. electrons and protons
C. protons and neutrons
D. All of the above

Answer:-

Option C. protons and neutrons

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Question # 33

Sample Chemist Interview Questions:

Answer:-

* Is this your first work experience in the position of an analytical chemist or have you worked in the similar position earlier?
* What according to you is the job profile of an analytical chemist?
* What do you understand by the term titration?
* What is the process of achieving equilibrium by adding certain reactants is known as?
* What are the various kinds of indicators used to reach an equivalence point?
* Define the process of Gravimetric analysis.
* What are the different applications used in the process of spectroscopy?
* What are the various functions of the process of spectroscopy?
* What is the technique that characterizes the chemical structure of materials at atomic level known as?
* Which process do you apply in order to decrease the complexity of material mixtures?
* What is the process that involves comparison of unknown sample to series of known standards by determining the amount of chemical in a material?
* How would you visualize single molecules, nano micro materials, biological tissues and single cells?
* Which process is considered as an important approach in the field of analytical science?

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Question # 34

What is octet rule in chemistry?

Answer:-

The octet rule is a simple chemical rule of thumb that states that atoms tend to combine in such a way that they each have eight electrons in their valence shells, giving them the same electronic configuration as a noble gas. This 8-electron configuration is especially stable because with 8 valence electrons, the s- and p-orbitals are completely filled (with 2 in the s-orbital, and 6 in the p-orbitals). Having completely filled orbitals provides increased stability due to something called "exchange energy."
The rule is applicable to the main-group elements, especially carbon, nitrogen, oxygen, and the halogens, but also the metals in the first two columns of the periodic table (but not to the transition metals in the middle of the periodic table). Note that the elements hydrogen (H) and helium (He) do not follow the octet rule, but rather the "duet" rule (2 electrons) because they do not have any p-orbital electrons.
In simple terms, molecules or ions tend to be most stable when the outermost electron shells of their constituent atoms contain eight electrons. The rule is commonly used in drawing Lewis dot structures.

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Question # 35

Explain the direction of the dipole moment expected for hydrogen bromide?

Answer:-

The HBr molecule is linear (obviously, since it contains only two atoms). The dipole moment is a vector, parallel to the bond, pointing toward the partially positively charged atom, which is, in this case, the hydrogen. The magnitude of the dipole moment is the difference in the partial electrical charges on each atom times the spatial separation of the atoms in the bond. In a molecule with more than two atoms (more than one bond), the dipole moment of each bond must be added vectorially

and the resultant vector will determine the dipole moment of the molecule. For instance, carbon dioxide has two carbon-oxygen double bonds of high polarity, but because the molecule is linear, and the individual dipoles oppose each other, the carbon dioxide molecule has no net dipole moment.

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Question # 36

Explain where does arsenic come from?

Answer:-

(FeAsS) Arsenopyrite also known as mispickel is the most common mineral containing arsenic.

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Question # 37

Explain what wavelengths can the human eye see?

Answer:-

Human eye is sensitive to an approximate range of wavelength of radiations from 380nm to 760nm. This portion of electromagnetic spectrum is identified as Light

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Question # 38

Explain what is ciprofloxacin HCL used for what type?

Answer:-

Ciprofloxacin is used to fight bacterial infections. I am currently taking this medicine to help cure mastoiditis.

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Question # 39

Explain what is the equation for photosynthesis?

Answer:-

1) Light energy
2) == 6CO2 + 6H2O --------> C6H12O6 + 6O2 ==
3) Carbon dioxide + water +light energy------> carbohydrates+ oxygen
hv
6CO2 + 6O2 -----> C6H12O6 + 6O2

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Question # 40

How to determine the 'pka ' of a given component?

Answer:-

pka or pkb depends on the compound taken. when pH is measured and the concentration of compound is known, they can be determine by simple related formulas under acids & bases section which we learnt.
Other explanation may be measuring rate of ionization of acid or base with experimental setup and then calculating the negative logarithm of concentration of acidic or basic species.

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Question # 41

Explain why positive charge will come on electropositive element?

Answer:-

The net charge on that element will be positive. The valence shell of such an element will have an excess electron which will be indicated by a positive charge. The excess electrons may be one or more. The electron donating nature of the element is indicated by the positive charge.

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Question # 42

Can you please explain the difference between differences between organic and inorganic chemistry?

Answer:-

Organic chemistry is the chemistry of carbon compounds while inorganic chemistry is the chemistry of all the rest of the elements on the periodic table.

Read More Answers.

Question # 43

Explain what element was used to make the first atomic bomb?

Answer:-

Uranium was used in the Hiroshima bomb and Plutonium in the Nagasaki one.

Read More Answers.

Question # 44

How to prepare a solution of 1 M HCl?

Answer:-

Exactly how you prepare will depend on what you are starting with. Typically, to make a 1 M HCl solution, you will be starting with a stock solution of more concentrated HCl that you will then dilute.

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Question # 45

Explain how does spontaneous combustion occur?

Answer:-

It is a type of combustion in which a material suddenly bursts into flames, without the application of any apparent cause

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Question # 46

Which one is polar HCl or HF?

Answer:-

This question is quite simple if you have an electro negativity chart:
Florine's Electronegativity: 4.0
Chlorine's Electronegativity: 3.0
Hydrogen's Electronegativity: 2.1
HCl: 3.0-2.1= .9 (Slightly polar)
HF: 4.0-2.1= 1.9 (Much more polar)

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Question # 47

Explain substituted hydrocarbon?

Answer:-

A substituted hydrocarbon is a hydrocarbon with one or more of the hydrogen is substituted with another element, (often a halogen such as chlorine or bromine) or another group of atoms such as -OH. Examples: -
a simple hydrocarbon is methane CH4. Substitute chlorine for hydrogen to get
CH3Cl Methyl Chloride is used for cleaning. Sub. Again to get
CH2Cl2 Methylene Chloride is used as paint stripper. Sub again to get
CHCl3 Chloroform is an ancient anesthetic. Sub again to get
CCl4 Carbon Tetrachloride is used in cleaning and fire extinguishers.
Substitute a single -OH group into -
CH4 to get CH3OH methanol or into C2H6 to get C2H5OH ethanol
The above examples all begin with unbranched non-cyclic hydrocarbons, but any hydrocarbon is a suitable target. A well-known instance is a double substitution of chlorine at opposite ends of a benzene ring to form paradichlorbenzene, commonly found hanging in toilet bowls. C6H6 becomes C6H4Cl2

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Question # 48

Explain the chemical formula for Epsom salts?

Answer:-

Epsom Salt chemical formula is Me245-H2O.

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Question # 49

Explain the net charge of a non-ionized atom?

Answer:-

In an atom, the number of protons is equal to the number of electrons and that one proton has the same positive charge value as an electron does a negative charge value.
Therefore, I am assuming that all atoms have no charge, zero, none, squat.
Non-ionized also means the atom has not suffered electron exchange, so a non-ionized atom is really just an atom (which is word redundancy).
This is what I know from AS level Chemistry, so I don't know if it's the same thing as more advanced chemistry (for university or something).

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Question # 50

Do you know where is tin obtained?

Answer:-

Tin is obtained in various places tin is found mainly in the ore cassiterite, which is found in Malaysia, Bolivia, Thailand, and Nigeria.

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Question # 51

Explain the difference in the modern periodic table and Mendeleevs table?

Answer:-

The periodic table is now arranged in the order of increasing atomic numbers. In addition, it is said that the modern table makes it easier to read and learn. The way that it is set up now allows scientists to make changes if necessary. Hope this helps

Read More Answers.

Question # 52

Tell me what is the dipole moment of chlorooctane?

Answer:-

There are multiple forms of the molecule "chlorooctane." This is because the chlorine atom can be attached to the octane chain in several different places, and each different placement will result in a different dipole moment. If you specify the structure of the compound more precisely (1-chlorooctane or 2-chlorooctane for example), it is possible to determine its dipole moment.

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Question # 53

What is full form of hcl?

Answer:-

The full form of HCL is hydrochloric acid or hydrogen chloride gas

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Question # 54

Tell me how are dipole attractions London dispersion forces and hydrogen bonding similar?

Answer:-

They are all forces of attraction used to kelp keep molecules together. Since the molecules are the atoms bonded together, there are no electrons, or not enough, left over to bond with more atoms. The result would be trillions of tiny molecules floating about. Instead, each of these types of attractions draws the molecules together into solids, liquids, or gases.

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Question # 55

Explain what is some importance of organic chemistry?

Answer:-

In organic chemistry one uses it both medicinally one uses it to test for illness way back from ancient times. It is also a good diagnostic tool by smell feel or touch. You can actually heed the smell of decay in organic chemistry

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Question # 56

Amongst the following, the most basic compound is
a) Benzylamine
b) Aniline
c) acetanilide
d) p - nitroaniline

Answer:-

Answer is --> Benzyl amine.
Due to resonance of electron pair in aniline,nitroaniline and acetanilide, these are weaker base than Benzyl amine(C6H5CH2NH2) .
Benzyl amine>Aniline>Acetanilide>Nitroaniline

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Question # 57

Explain the direction of the dipole moment expected for carbon tetrachloride?

Answer:-

It has no net dipole moment. Hence, it is non-polar.

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Question # 58

Explain what is the structure of a DNA molecule?

Answer:-

A molecule of DNA is double-stranded. The molecule has the shape of a double helix.
The DNA molecule consists of two complementary strands oriented in an anti-parallel fashion. Each strand is composed of nucleotides. A nucleotide consists of a base (a purine or pyrimidine), a sugar (between the other two components) named deoxyribose, and a phosphate group. Nucleotides are linked to each other via phosphodiester bonds, forming a sugar-phosphate backbone to each strand.
The base of each nucleotide projects into the interior cavity of the helix. Each base is opposite another base: adenine (a purine) is always paired with thymine (a pyrimidine), and guanine (purine) with cytosine (pyrimidine); this phenomenon is called complementary base pairing.
Each nucleotide forms hydrogen bonds with its complementary base on the other strand. Two hydrogen bonds form between adenine and thymine; three hydrogen bonds form between guanine and cytosine.

Read More Answers.

Question # 59

Explain what is alum?

Answer:-

Alum is a chemical (aluminum potassium sulphate); it tends to be whitish powder with several uses, including:
1. As an astringent
2. As an antibacterial
3. As a food preservative
4. As a 'Styptic pencil' to heal shaving cuts
5. To stem the flow of minor blood loss and cuts
6. Soaked into materials to make them flame retardant
There are other uses, but these are some of the more common ones.

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Question # 60

Tell me Is HCl an acid or a base?

Answer:-

HCl, or hydrochloric acid, as the name implies, is an acid. In fact, it is considered a strong acid because it dissociates completely in water to form H3O+ and Cl-. However, it can also act as a base in reactions with acids stronger than it can like HClO4.

Read More Answers.

Question # 61

Explain what is protein in Chemistry?

Answer:-

Protein is a source of backup energy that your body stores, a large complex molecule made up of one or more chains of amino acids. Proteins perform a wide variety of activities in the cell.
Highly complex nitrogenous compounds found in all animal and vegetable tissues. Proteins, the principal constituents of the protoplasm of all cells (apart from water), are of high molecular weight, and consist essentially of combinations of amino acids in peptide linkages. Twenty different amino acids are commonly found in proteins and each protein has a unique, genetically defined amino acid sequence that determines its specific shape and function.

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Question # 62

Tell me what is an oxidizing agent?

Answer:-

Any chemical species that has a tendency to accept electrons and thereby undergoing reduction themselves is known as an oxidizing agent

Read More Answers.

Question # 63

Explain hydrocarbons?

Answer:-

Hydrocarbons are compounds made entirely out of Hydrogen and Carbon

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Question # 64

Explain hydra?

Answer:-

Hydra is a type of polyp. It is an animal, because it moves around like one even though it looks like a plant. A hydra is from the Phylum Cnidarian and belongs with others such as jellyfish and coral.

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