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Level: 100

 **Answers to questions.**

**Number 1.**

A. a) The rule of 13 states that the formula of a compound is a multiple ‘n’ of 13 ( the molar mass of CH) plus a remainder ‘r’.

According to the rule of 13, n = $\frac{molecular ion}{13}$

$$C\_{n}H\_{n+r}$$

If one has heteroatoms, adjust the formula

* For O, add O and subtract $CH\_{4}$
* For N, add N and subtract $CH\_{2}$
* Or Cl, add Cl and subtract $C\_{2}H\_{11}$

 C7H5O,C4HN4,C6HO2,C7H5O,C6H5N2,C7NH7,C6NH3O

B. Organic compounds are important because all living organisms contain carbon. The three basic macromolecules of live are carbohydrate(CH2O),fats(CHO) and protein(CHON).Organic compounds are important because they serve as the basis for all carbon-based life on earth, create energy production in biological life, cause atmospheric depletion.

**In human Body:**

It contains the basic macromolecules such as;

I. In Carbohydrate: Biological molecules consisting carbon, hydrogen and oxygen, synonymous with a group of elements that may include sugar, cellouse and starch in biochemistry. Polysaccharides serve to store energy and as a structural components in plants and arthropods.

ii. In protein: Protein is composed of chains of organic molecules called amino acids. Protein is important in a diet to provide source off amino acids. Protein broken down in the stomach and intestine are absorbed into the body.

iii. Lipids: The main function of lipids include storing energy, signaling lipids

iv. As the basis of food: food materials are created from carbon compounds via carbohydrate, protein and fats. Organic molecules make up a large portion of human diet and are found in all food consumed by individual. It is requires a large number of organic molecules needed to keep cells and tissues healthy.

Others are;

v. In metabolism: The three main purpose of metabolism are energy, fuel conversion as energy for cellular processes, fuel conversion to build block for protein lipids, nucleic acid and some carbohydrate as well as the elimination of nitrogenous waste.

**In society:**

i. Ancient life forms buried beneath the surface of the earth turned into hydrocarbons that form the basis of humanity mechanical energy. Crude oil is refined into gasoline, propane, diesel, kerosene and natural gas to provide fuel for automobiles and heating systems.

ii. Alcohols include chemicals like ethanol and isopropanol. These are used as antiseptics and ethanol is staple of the beverage industry.

iii. Carboxylic acids include a wide variety of chemicals including pharmaceuticals. Aspirin contains carboxylic acid.

iv. Most sterilizing agents and disinfectants like phenol, formaldehyde are carbon compounds. Due to their properties like solubility, pH they can kill microbes and human body cells.

C.

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| **Homocyclic compounds** | **Heterocyclic compounds** |
| The rings of homocyclic compounds are made up of carbon atoms only | The rings of heterocyclic compounds are made up of more than one kind of atom such as nitrogen, oxygen and sulphur |
| There rings contain same element | There rings contain atoms of different element |
| They are also called cabocyclic or isocyclic compounds | Also called cyclic compounds |
| Contains atoms of same element bonded to each other forming a ring | Contains atoms of at least two different elements bonded to each other forming a ring |
| They are subdivided into Alicyclic and Aromatic homocyclic compounds | They are subdivided into Alicyclic and Aromatic heterocyclic compounds |
| Examples include phenol, Toluene,beneze | Examples include Pyridine,furan,piperidine. |

**Number 2**

A.Retardation factor(Rf)= Distance moved by bands

 Distance moved by solvents

Band A Rf= 2.4/12.2=0.196

Band B Rf= 5.6/12.2 =0.459

Band C Rf= 8.9/ 12.2 =0.729

B.A is an aldehyde

 B is an alkenes

C.2,4 dinitrophenlhydrazine test is employed for aldehydes and ketones.

D.

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| Functional group | General formula  | Class of organic compounds | Examples |
| -f,-Cl,-Br,-I | R-X | Alkyl halides/haloalkane | Bromoethane(C2H5Br)Chloropropane(C3H7Cl) |
| -OH | ROH | Alkanols/alcohol | Butanol(C4H10O)Ethanol(C2H6O) |
| -COH | RCOH | Alkanals | Ethanal(C2H4O)Butanal(C4H8O) |
| -COOH | RCOOH | Carboxylic acid | Pentanoic acid(CH3(CH2)COOH)Propanoic acid(C3H6O2) |
| -NH2 | RNH2 | Amines | Methylamine (CH5N)Ethylamines(C2H5NH2) |
| -CO- | RCOR´ | Ketones | Propan-2-one(C3H6O)Butanone(C4H8O) |
| -COOR´ | RCOOR´ | Esters | Methyl etanoate(C3H6O2)Ethyl ethanoate(C4H8O2) |