1. (a) If the mass of the molecular ion is odd it means that there is a presence of Nitrogen

N=14amu

105-14=91

* Determine the number of Carbon and Hydrogen atoms

For Carbon (12amu): 91/12 =7.6

This means there is a presence of 7 Carbon atoms

7\*12= 84

For Hydrogen (1amu): 91-84=7

C7H7N

* Calculate the Index Of Hydrogen Deficiency (IHD)

Formula: 2N+2-M÷2

(2\*7)+2-7÷2 = 4.5=5

This means there double bonds or triple bonds or a presence of a ring in the structure of the compound.

* To add Oxygen (16amu)

1 Carbon atom and 4 Hydrogen atoms (a total of 16amu) will be taken out of the compound

This means we are left with C6H3ON

* Calculate the IHD

(2\*6)+2-3÷2 =5.5=6

(b) (i) Organic compounds are important because all humans are made up of carbon

(ii) They are important because a lot them are part of the food that we eat in form of nutrients e.g. proteins, carbohydrates, etc.

(iii) Some organic compounds form the fuel (fossil fuel from Coal) we use to power some of our machines or appliances today.

(iv) Medicines like Penicillin, Chloromycetin, etc are created using organic compounds.

(v) Some house hold articles like soap, cosmetics, perfumes, etc are gotten from organic compounds.

(c) Homocyclic compounds are in ring structures and contain only of carbon atoms within the ring. A very good example is Benzene. While Heterocyclic compounds are compounds that have atoms of at least two different elements as members of its ring eg Pyridine.

1. (a) for 2.4cm Rf value = 2.4/12.2 = 0.197cm

for 5.6cm Rf value = 5.4/12.2 = 0.459cm

for 8.9cm Rf value = 8.9/12.2 = 0.730cm

(b) A is an Aldehyde

 B is an Alkene

(c) 2,4-dinitrophenylhydrazine test is used to test for the presence of Aldehydes and Ketones

(d) (i) –(single bond) : Alkanes: CH4 C2H6

(ii) =(double bonds): Alkenes: C2H4 C4H8

(iii) –OH : Alcohols : C2H5OH C3H7OH

(iv) –X : Alkylhalides : C2H5Br C3H7Cl

(v) –OR : Ethers : C2H5OC3H7 C3H7OC5H11

(vi) –NH2 : Amines: C2H5NH2 C4H9NH2

(vii) RCOOR’ : Esters: C3H7COOC3H7 C4H9COOC4H9