**QUESTION 1**

a. Following nitrogen rule, nitrogen atoms for a odd molecular ion is odd

If m/z 105 contains 1 nitrogen atom (NOTE: N = 14)

105 - 14 = 91

Number of carbon atoms in m/z 105

91/12 = 7 remainder 7

Therefore a possible formula is C7H7N

If m/z 105 contains 3 nitrogen atoms

105 - 3\*14 = 63

Number of carbon atoms

63/12 = 5 remainder 3

Therefore a possible formula is C5H3N3

So the possible formulas for molecular ion m/z 105 are C7H7N and C5H3N3 and others.

b. Importance of organic compounds

* They are important in production of antiseptics.
* They are important in the production of fuels e.g alkanes which are used as cooking gas.
* They are also used in the production of beverages e.g alkanol (alcohol).
* They are also important in the production of pharmaceuticals e.g carboxylic acids.

They are important in the production of anesthetics e.g diethyl ether .

* They are important in the production of solvents such as paints and varnishes.

c. Difference between homocylic compounds and heterocyclic compounds is that homocyclic or carbocyclic compounds contain rings which are made up of only one kind of atoms, i.e., carbon atoms. While cyclic compounds that contain one or more atoms other than that of carbon atoms in their rings are called heterocyclic compounds.

**QUESTION 2**

a. Retardation factor = distance moved by band / distance moved by solvent front

Rf1 = 2.4 / 12.2

= 0.197

Rf2 = 5.6 / 12.2

= 0.459

Rf3 = 8.9 /12.2

= 0.729

b. Organic compound A - Aldehydes

Organic compound B - Alkenes

c. It is employed in the test for Aldehydes and ketones.

d.

* Alkanes - methane and butane
* Alkenes - ethene and pentene
* Alkyne - ethyne and butyne
* Alkanol - methanol and propanol
* Haloalkanes - methyl chloride and ethyl bromide
* Aldehydes - propanal and butanal
* Alkanoates - ethyl propanoate and methyl butanoate