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**MATRIC NO: 17/ENG07/013**

**DEPARTMENT: PETROLEUM ENGINEERING**

**COURSE TITLE: GENERAL CHEMISTRY II**

**QUESTION 1**

A. Fragment at m/z =105

N=14amu. 105-14=91

91/12 = 7.5---------C7NH?

7\*12 = 84

1\*14 = 14

105 - (84+14) = 7

So therefore 7 hydrogen's gives C7NH7

Therefore... (2n +2 -no of hydrogen)/2

[2(7.5) +2-7]/12= 5.25

Then add an oxygen atom

C7NH7 -------C6NOH3

[(2(6.5) +2-3)/2]=5.5

b. What are the importance of organic compounds?

– Organic compounds are important because they serve as the basic form of all carbon bases for life on earth.

* Create energy production in biological life
* Causes atmospheric depletion and releases hydrocarbon energy
* Organic compounds have versatile bonding patterns and are part of all organisms
* Long carbon chain can be produced
* Will bond with many other elements
* Can form single, double and triple bonds
* A huge number of carbons is produced
* Organic compounds form stable bonds to other carbon atoms- (catenation).

c. Differentiate between homocyclic and heterocyclic compounds.

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| --- | --- |
| HOMOCYCLIC COMPOUND | HETEROCYCLIC COMPOUND |
| Homocyclic compound are cyclic compounds having atoms of the same elements as ring members. | Heterocyclic compounds are cyclic compounds having atoms of the different elements as ring members including carbon atoms. |
| Ring contains atoms of the same element | Ring contains atoms of different elements |
| Contain atoms of the same elements bonded to each other forming a ring | Contain atoms of at least two different elements boned to each other forming a ring |
| Examples include benzene, cyclohexane, toluene, cyclohexanol, etc. | Example include pyran, azocine, thiocane, etc. |

QUESTION 2

1. R.f of the first band = 2.4/12.2= 0.19=~ 0.2.

R.f of the second band= 5.6/12.2= 0.45=~ 0.5.

R.f of the third band= 8.9/12.2= 0.729=~ 0.73.

b. Two organic compounds were labelled A and B

A – Isobutyl aldehyde

B – Cyclohexane

Isobutyl aldehyde gave a positive test result (dark grey precipitate) to Tollens test and cyclohexane decolorizes Bromine water. A belongs to the aldehyde group, while B belongs to the alkene group.

c. Brandy’s test 2, 4- Dinitrophenyl hydrazine can be used to qualitatively detect the carbonyl functionality of a ketone or aldehyde functional group.

d. List 7 functional groups of organic compounds giving two examples

|  |  |  |
| --- | --- | --- |
| Organic compounds | Functional group | example |
| 1. Alkanes | RH | CH4- methane  C2H6- propane |
| 1. Alkenes | RR’  C=CR2R3CH3 | CH2=CH2- ethylene  CH2=CH2- propene |
| 1. Alkynes | RIC≡CR2 | HC≡ CH- acetylene  CH3 C ≡ CH HC≡ CH- propene |
| 1. Alcohols | ROH | CH3OH- methanol  C2H5OH- ethanol |
| 1. Alkyl halides | RX | CHCL3- chloroform  CH2CL2- dichloromethane |
| 1. Aldehyde | RCHO | CH3CHO- ethanal  CH2O- methanal |
| 1. Carboxylic acid | RCOOH | CH3COOH- ethanoic acid  HCOOH- formic acid |