****

**P525/2**

**CHEMISTRY**

**PAPER 2**

**2½HOURS**

**CHEMISTRY DEPARTMENT**

**S.5 END OF TERM ONE EXAMINATIONS 2024**

**UGANDA ADVANCED CERTIFICATE OF EDUCATION**

**CHEMISTRY PAPER 2**

**Time: 2½hours**

**NAME…………………………………………………………………………………………….COMBINATION……………………………..**

**INSTRUCTIONS:**

**Answer all questions in this paper**

**Write the answers in the answer sheets provided.**

**Write clearly and begin each number on a fresh page**

1. Define the following term as applied to organic chemistry.
2. Catenation (01mark)
3. Hybridization (01mark)
4. Hydrocarbon (01mark)
5. Function group (01mark)
6. Homologous series (02 mark)

 b)i Define the term isomerism (02mark)

 (ii) Explain the three types of structural isomerism while giving examples in each case. (14marks)

 2a.) State Graham’s law of gaseous diffusion (02marks)

 (b). If we consider two gases x and y which diffuse at a rate Rx and Ry respectively, and that the density of the gases are Ꝭx and Ꝭy respectively; prove that.

 $\frac{Rx}{Ry}=\frac{\sqrt{Ꝭy}}{\sqrt{Ꝭx}}$ (05marks)

 (C).The time taken for 0.06cm3 of oxygen to diffuse through a porous partition is 10 seconds. Another gas Z at the same conditions of temperature and pressure diffuses through the partition at the rate of 0.1cm3 in 20 seconds. Determine the relative molecular mass of gas Z. (05Marks)

(d). Two pieces of cotton wool were each soaked separately in concentrated ammonia solution and concentrated hydrochloric acid respectively and simultaneously inserted into opposite ends of a horizontal wide glass tube. After a short time a white ring was across the tube. If the distance between the inner surfaces of the cotton wool plugs is 50cm.

 (i). Name the white ring (01mark)

 (ii). Write the equation leading to formation of the white ring. (02marks)

 (iii).Determine how far from the ammonia plug the white ring is formed. (05mark)

 (3a). Define the term electronic configuration (01mark)

 (b). State the two principles which are used while writing electronic configuration (03 mark)

 (c). Write the electronic configurations of the following. (04marks)

 (i). Zinc

 (ii). Aluminium ion

 (iii). Calcium ion

 (iv). Sulphur

 d. Define the Atomic radius

 e. The table below shows the atomic radii and ionic radii of elements in period 3 of the periodic table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element | Na | Mg | AL | Si | P | S | C$ι$ |
| Atomic radius (nm) | 0.156 | 0.135 | 0.125 | 0.117 | 0.110 | 0.104 | 0.099 |
| Ionic radius (nm) | 0.095 | 0.065 | 0.054 |  | 0.212 | 0.184 | 0.181 |

(i). State and explain the trend in atomic radius of the elements (3mrks)

(ii). Explain why the ionic radii of Na+, Mg2+ and A$ι$3+ are small than those of the corresponding atoms.(3mrks)

(iii). Explains why the ionic radii of P3-, S2- and C$ι$- are small than those of the corresponding atoms. (3mrks)

(iv). The ions Na+, Mg2+, and A$ι$3+ have the same electronic configuration, yet they have different ionic radius. Suggest a reason for this. (02 marks)

(4a).Define the term carbonium ion.

 (b). With examples in each case, explain the three types of carbonium ion and arrange them according to the order of their stability (7marks)

(c). Write the structural formula of the following compounds:

1. 2-bromocydohexanol
2. 4-bromo, 2-chloro, 3,3-dimethylpentene. (02marks)

 (d). Name the structures of organic compounds below.

 CH3CH CH CH CH CH CH (02marks)

 CH3  Br

 CH3

 (e). complete the following equations and suggest a suitable mechanism for each reaction.

(i). CH3CH2CH3 cmc HNO3  (04 marks)

150°c

(ii). CH3CH2CH CH3 + Excess chlorine (04 marks)

 UV.light

**\*END\***