ALLIANCE INTEGRATED SECONDARY SCHOOL

S.6 TERM 1 ASSESSMENT 2026

DURATION: 1HR:30MINS

INSTRUCTIONS:

- **Attempt All**
- **Be Neat**

1) While in the laboratory, an argument rose up between two senior three students after se eing

certain information on one of the bottles in the laboratory. This information is for compound D which is an organic acid whose formula is: HxCyOz. nH2O. On its bottle its written that D c ontains 26.7% Carbon, 2.2% hydrogen and 71.1% oxygen by mass. On the same bottle its wr itten that it has a vapor density of 5.625X10-3gcm-3 at s.t.p. Your teacher of chemistry has requested you to help the senior three students under the issue at hand.

In your message include the following:

(a) Determine empirical formula of the anhydrous form of Q.

(b) Deduce the values of x, y and z.

(c) Determine the value of n and hence the formula of the hydrated D.

(d) Write the IUPAC name of D.

(e) Determine the percentage of water of crystallization in D.

2) You are part of a national science competition where your school has been tasked with s olving a mystery involving a malfunctioning industrial machine used in metal processing. The machine separates metals based on their reactivity and electronic configuration, but it has stopped working correctly due to a suspected programming error in how it identifi es elements. Your team is given a list of six elements used in the machine's sorting syste m: Iron (Fe, 26) Magnesium (Mg, 12) Calcium (Ca, 20) Manganese (Mn, 25) Potassium (K, 19) Zinc (Zn, 30)

Task.

(a) You must reprogram the machine to correctly sort these elements by confirming their ele ctronic configurations.

(b) The machine accidentally classified manganese and zinc in the same category. Based on their configurations, explain why this is incorrect.

(c) Suggest how the machine should differentiate elements with partially filled d-orbitals fro m those with filled ones.

THE END

3) The National Water and Sewerage Corporation evaluated different halogens for water tr eatment. They compared chlorine, bromine, and iodine in terms of disinfecting power, sol ubility, and cost. The team explained how oxidizing ability decreases down the group, ma king chlorine the most effective disinfectant. They also considered the formation of disin fection byproducts and adjusted pH to optimize chlorine efficiency, ensuring safe drinkin g water for Ugandan households.

Task:

a) Explain the trend in oxidizing power down Group 17.

b) Write the reaction between chlorine and water.

c) State why iodine is less soluble in water than chlorine.

THE END