PRACTICAL PROBLEMS

PROBLEM 1 (Practical)

a) Three numbered test-tubes (1-3) contain mixtures of two substances from the following pairs (4 variants):

1.	$ZnSO_4$ - NaBr	NaCl - $Ca(NO_3)_2$	$MgSO_4$ - NH_4Cl
2.	$AlCl_3$ - KBr	$CaCl_2$ - $NaNO_3$	$ZnCl_2$ - $(NH_4)_2SO_4$
3.	KNO_3 - Na_2CO_3	KCl - $MgSO_4$	NH_4Cl - $Ba(NO_3)_2$
4.	$MgCl_2$ - KNO_3	K_2CO_3 - $ZnSO_4$	$Al(NO_3)_3$ - NaCl

b) Each of the test-tubes numbered 4 and 5 contains one of the following substances: glucose, saccharose, urea, sodium acetate, oxalic acid.

Problem:

By means of reagents that are available on the laboratory desk determine the content of the individual test-tubes. Give reasons for both the tests performed and your answers and write the chemical equations of the corresponding reactions.

Note:

For the identification of substances given in the above task, the following reagents were available to competing pupils: 1 N HCl, 3 N HCl, 1 N H_2SO_4, concentrated H_2SO_4, $FeSO_4$, 2 N NaOH, 20 % NaOH, 2 N NH_4Cl, 2 N $CuSO_4$, 2 N $BaCl_2$, 0,1 N $AgNO_3$, 0,1 % $KMnO_4$, distilled water, phenolphtalein, methyl orange. In addition, further laboratory facilities, such as platinum wire, cobalt glass, etc., were available.

PROBLEM 2 (Practical)

Allow to react 10 cm^3 of a 3 N HCl solution with the metal sample (competing pupils were given precisely weighed samples of magnesium, zinc or aluminium) and collect the hydrogen evolved in the reaction in a measuring cylinder above water. Perform the task by means of available device and procedure.

In order to simplify the problem, calculate the mass of your metal sample from the volume of hydrogen on the assumption that it was measured at STP conditions.