

SECTION B

Answer **any three** questions from Section B. Each question in Section B carries 20 marks.

1. One mole of an ideal gas is allowed to expand against piston that supports 0,4atm pressure. The initial pressure is 10atm and the final pressure is 0,4atm. The temperature is kept constant at 0°C.
 - (a) How much energy is transferred to the surroundings (mechanical) from the gas during the expansion?
 - (b) What is the change in the internal energy and enthalpy of the gas?
 - (c) How much heat energy is absorbed from the thermal surroundings?

2.
 - (a) State six (6) factors that influence the rate of chemical reactions.
 - (b) What is the difference between the order and molecularity of a reaction?
 - (c) For a zero order reaction, show that if x is the amount transformed into products after time t the $x = kt$.

3.
 - (a) Draw a titration curve, when 100.00ml 0,10M Na_2CO_3 is titrated with 0,10MHCl, Calculate the pH when the following volumes of acid have been added:
 - (i) 50.00ml
 - (ii) 91.00ml
 - (iii) 98.00ml
 - (iv) 109.00ml
 - (v) 150.00ml
 - (vi) 191.00ml
 - (vii) 199.00ml
 - (b) A base of mass 0,534.1g containing 92% NaOH and 8% impurities was dissolved in a volumetric flask of volume 100,00ml. Calculate the molar concentration of the solution HCl if 15,00ml of the solution was titrated with 19,50ml acid HCl.

4.
 - (i) Why is the complexometric titration of CO^{2+} ; Zn^{2+} ; Ni^{2+} and Cd^{2+} done in an ammonium buffer solution.
 - (ii) Why is the determination of cations with a charge of +3 and +4 with EDTA carried out in acidic media.
 - (iii) 1,703g of $\text{Al}(\text{NO}_3)_3 \cdot n\text{H}_2\text{O}$ was dissolved in 200,0ml to a 20,0ml aliquot was added Na_2Mg EDTA. In the titration of Mg^{2+} 17,45ml 0,02507M EDTA was used. Calculate the percentage (%) concentration of $\text{Al}(\text{NO}_3)_3$ in the sample.

END OF QUESTION PAPER!!!!

