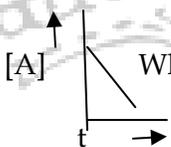




- 9 A solution of glycerol ( $C_3H_8O_3$ ; molar mass= $92\text{g mol}^{-1}$ ) in water was prepared by dissolving some glycerol in 500g of water. This solution has a boiling point of  $100.42^\circ\text{C}$ . What mass of glycerol was dissolved to make this solution? ( $K_b$  for  $H_2O=0.512\text{ K Kg mol}^{-1}$ ) 2
- 10 The rate constant for a reaction of zero order in A is  $0.0030\text{ mol L}^{-1}\text{s}^{-1}$ . How long it will take for the initial concentration of A fall from 0.10 M to 0.075M? 2
- 11 a) What is meant by the 'rate constant, k' of a reaction? If the concentration be expressed in  $\text{mol L}^{-1}$  units and time in seconds, what would be the units for k (i) for a zero order reaction and (ii) for a first order reaction? 2  
b) What type of collisions is known to be effective?
- 12 A well known mineral fluorite is chemically calcium fluoride. It is known that in one unit cell of this mineral there are  $4\text{Ca}^{2+}$  ions and  $8\text{F}^-$  ions and that  $\text{Ca}^{2+}$  ions are arranged in a fcc lattice. The  $\text{F}^-$  ions fill all the tetrahedral holes in the face centered cubic lattice of  $\text{Ca}^{2+}$  ions. The edge of the unit cell is  $5.46 \times 10^{-8}\text{ cm}$  in length. The density of the solid is  $3.18\text{ g/cm}^3$ . Use this information to calculate Avogadro's number. (Molar mass of  $\text{CaF}_2 = 78.08\text{ g mol}^{-1}$ ) 3
- 13 A copper - silver cell is set up. The copper ion concentration is 0.10M. The concentration of silver ion is not known. The cell potential when measured was 0.422V. Determine the concentration of silver ions in the cell. (Leave your answer in terms of log but completely solved till that stage) (Given  $E^\circ_{\text{Ag}^+/\text{Ag}}=0.80\text{V}$ ,  $E^\circ_{\text{Cu}^{2+}/\text{Cu}}=0.34\text{V}$ ) 3
- 14 a) From the graph:  What is the order of the reaction? 3  
b) A first order decomposition reaction takes 40 min for 30% decomposition. Calculate its  $t_{1/2}$  value. ( $\log 10=1$ ,  $\log 7=0.8451$ )
- 15 a) 2g each of two solutes A and B (molar mass of  $A > B$ ) are dissolved separately in 200g each of the same solvent. Which will show greater elevation in boiling point? 3  
b) The molal elevation constant for  $H_2O$  is  $0.52\text{ K/m}$ . Calculate the boiling point of solution made by dissolving 6 g of urea ( $\text{NH}_2\text{CONH}_2$ ) in 200 g of  $H_2O$ .
- 16 a) Complete the following chemical reaction equations: 5  
i.  $\text{P}_4 + \text{SOCl}_2 \rightarrow$   
ii.  $\text{XeF}_4(\text{s}) + \text{H}_2\text{O}(\text{l}) \rightarrow$   
b) Explain the following observations giving appropriate reasons:  
i. Solid phosphorus pentachloride behaves as an ionic compound.  
ii. Halogens are strong oxidizing agents.  
iii.  $\text{H}_3\text{PO}_3$  is diprotic acid.

PART B

- 17 Why is it that tests for Barium, Strontium and Calcium to be done in order? 2
- 18 Explain one confirmatory test for  $\text{Ni}^{2+}$ . 2
- 19 (a) Give the formula of reddish yellow vapours evolved during chromyl chloride test? 1,2  
(b) Explain the  $\text{Cl}_2$  water test for iodide with equation.
- 20 Explain the indicatory and confirmatory tests for sulphide. 3
- 21 (a) How can one distinguish between sulphite and sulphate using  $\text{BaCl}_2$  test. 5  
(b) What is the colour seen in flame for strontium salt.  
(c) What is the yellow ppt. in  $\text{K}_2\text{CrO}_4$  test for lead due to?  
(d) What is the canary yellow ppt. in Ammonium Molybdate test for Phosphate due to?  
(e) What is the formula for brown ring?

