

[This question paper contains 4 printed pages.]

4405

Your Roll No. ....

Subsidiary for B.Sc. Honours/I

AS

CHEMISTRY – Paper I

Inorganic and Physical Chemistry

Time : 3 Hours

Maximum Marks : 50

*(Write your Roll No. on the top immediately  
on receipt of this question paper.)*

*Answers to Sections A and B should be  
written in separate answer-books.*

*Use of log tables and scientific calculator is allowed.*

SECTION A

(Marks : 33)

*Attempt four questions in all.*

*Question No. 1 is compulsory.*

1. Explain the following :

(i) Solubility order of the following compounds in water

LiF, LiCl, LiBr, LiI

(ii) H-bond is a weaker bond but is vital for the existence of life.

(iii) The formation of  $F^-(g)$  from  $F(g)$  is exothermic while that of  $C^-(g)$  from  $O(g)$  is endothermic.

P.T.O.

(iv) H-O-H is amphoteric while Na-O-H is basic.

(v) The conductivity of  $\text{Li}^+$  ions in aqueous solution is less than that of  $\text{Cs}^+$  ion. (2,2,2,2,1)

2. (i) What is the difference between roasting and calcination? Give two examples each.

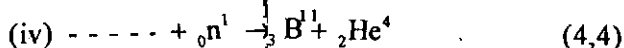
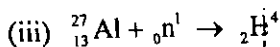
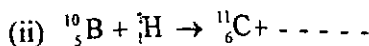
(ii) Describe a method for the concentration of sulphide ores. (4,4)

3. (a) The amount of  $^{14}\text{C}$  isotope in a piece of wood is found to be  $\frac{1}{10}$ th of its amount present in a fresh piece of wood. Calculate the age of the wood, given that the half life of  $^{14}\text{C}$  is 5770 years.

(b) What is the difference between isotope and isotone? Explain with examples. (4,4)

4. (a) Draw the resonating structures of  $\text{CO}$ ,  $\text{NO}_3^-$ .

(b) Fill in the blanks :



5. (a) On the basis of VSEPR theory, draw the structures of the following  
 $I_3^-$ ,  $PF_3$ ,  $BrF_3$
- (b) Bond angle in  $OF_2$  is less than  $H_2O$ .  
Explain. (6,2)
6. (a) Lithium combines with oxygen to form oxide while other alkali metals form peroxides and superoxides.
- (b) Alkaline earth metals only form compounds in +2 oxidative state and not in +1 oxidative state.
- (c) Cs is a better photoemitter than Sodium.
- (d) Alkali metals are soft. (2,2,2,2)

**SECTION B** (Marks : 17)

*Attempt any one of the two questions.*

*Third question is compulsory.*

1. Are the following statements true or false. Explain with reasons.
- (a) Size effect decreases the pressure of the gas from the ideal value.
- (b) In bimolecular gaseous reaction every collision between the reacting molecules leads to chemical reaction.

- (c) An ideal gas cannot be liquified.
- (d) Half life of a first order reaction is independent of the initial concentration of reactants. (2×4)
2. (a) Why do gases deviate from ideality? How does the van der Waals equation account for the deviations? (4)
- (b) The decomposition of Ammonium Nitrite to form  $N_2$  was studied at  $25^\circ C$ . The volume of  $N_2$  collected at different intervals was the following:
- |                    |      |     |      |       |          |
|--------------------|------|-----|------|-------|----------|
| Time (min)         | 10   | 15  | 20   | 25    | $\infty$ |
| Vol. of $N_2$ (ml) | 6.25 | 9.0 | 11.4 | 13.64 | 35.05    |
- Show that the reaction is first order. Determine the  $t_{1/2}$  of the reaction. (4)
3. Write short notes on any **three** of the following:
- (a) Collision theory of reaction rate
- (b) Kinetic theory of gases
- (c) Promoters & Poisonous catalysts
- (d) Order & molecularity of a reaction (3×3)