

INTERNATIONAL INDIAN SCHOOL DAMMAM

FIRST TERM EXAMINATION ( 2015 - 2016)

CLASS – XII

SET - A

SUBJECT : CHEMISTRY

Time allowed: 3 hours

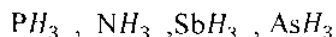
Maximum Marks: 70

**General Instructions:**

- All the questions are compulsory.
- Questions 1 to 5 are very short answer type questions and carry one mark each.
- Questions 6 to 10 carry two marks each.
- Questions 11 to 22 carry three marks each.
- Questions 23 is value based question carrying four marks.
- Questions 24 to 26 carry five marks each.
- Logarithmic table is allowed but not calculator.

1.  $PCl_5$  is ionic in nature in the solid state . Why ?

2. Arrange the following in increasing order of basic strength :



3. What are the products of electrolysis of aqueous solution of  $AgNO_3$  with silver electrodes ?

4. Write the structure of 4 – tert. – butyl – 3 – iodoheptane .

5. How much charge is required for the reduction of 1 mol of  $MnO_4^-$  to  $Mn^{2+}$  ?

6. (i) What is meant by ' doping ' in a semiconductor . Why it is done ?

(ii) What is ' forbidden zone ' in reference to band theory of solid ?

7. Describe how the following changes are brought about :

(i) Zinc oxide into metallic zinc .

(ii) Impure titanium into pure titanium .

8. If the radius of the octahedral void is  $r$  and radius of the atoms in close packing is  $R$ , derive relation between  $r$  and  $R$ .

9. Describe the role of :

(i)  $SiO_2$  in the extraction of copper from copper matte .

(ii) Cryolite in the metallurgy of Aluminium .

10. Define the term osmotic pressure . Is the osmotic pressure of a solution a colligative property ? Explain .

11. Calculate the value of Avogadro Number from the following data :

Density of NaCl =  $2.165 \text{ g cm}^{-3}$  , distance between  $\text{Na}^+$  and  $\text{Cl}^-$  = 281 pm & molar mass of NaCl = 58.5 u

12. How is 1 – propoxy propane synthesized from propan – 1 – ol ? Write mechanism of this reaction .

13. (i) What is meant by Coordination number ?

(ii) Arrange the following types of interactions in correct order of their increasing strength :

Covalent, hydrogen bonding, Vander Waals, dipole dipole

(iii) How can a material be made amorphous. ?

14. (i) Write chemical equation for Kolbe's reaction .

(ii) Convert : Methyl magnesium bromide into 2 – methylpropan – 2 – ol.

(iii) Distinguish by chemical test between phenol and ethanol .

15. Give reasons for the following :

(i) The reduction of metal oxide easier, if the metal formed is in liquid state at this temperature.

(ii) The anodes used in the electrolytic cell for the reduction of alumina need to be replaced regularly?

(iii) Zinc not extracted from zinc oxide through reduction using CO. Why ?

16. Explain why

(i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride?

(ii) Thionylchloride method is preferred for preparing alkyl chloride from alcohols.

(iii)  $\text{C}_6\text{H}_5\text{CHClC}_6\text{H}_5$  is more easily hydrolysed than  $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$  by aqueous KOH .

17.(a) What is van't Hoff factor ? What is its value for  $\text{Na}_3\text{PO}_4$  when it is completely ionized .

(b) The depression in F.P. of water observed for the same amount of acetic acid ,trichloro acetic acid at trifluoro acetic acid increases in the order given above. Explain .

18. Molar conductivities at infinite dilution ( $\Lambda_m^0$ ) for  $\text{NH}_4\text{Cl}$  , $\text{NaOH}$  &  $\text{NaCl}$  solution at 298K are respectively 129.8,217.4 & 108.9  $\text{S cm}^2\text{mol}^{-1}$  and the molar conductivity of a  $10^{-2}$  M solution of  $\text{NH}_4\text{OH}$  is 9.33  $\text{S cm}^2\text{mol}^{-1}$ . Calculate its dissociation constant.

19. (a) How will you bring about the following conversions :

(i) Chloromethane to propanone .                      (ii) Ethyl iodide to propanoic acid .

(b) What happens when chloroform undergoes oxidation by air .

20. A solution containing 30 g of non-volatile solute exactly in 90 g of water has vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: (i) molar mass of the solute (ii) vapour pressure of water at 298 K.

21. (i) Complete and balance the equation :  $(\text{CH}_3)_3\text{CBr} + \text{KOH} \xrightarrow[\Delta]{\text{Ethanol}} ?$

(ii) Predict the order of reactivity of the four isomeric bromobutane compounds in  $\text{SN}^2$  reactions .

(iii) What is meant by chirality of a compound ? Give an example .

22. What is a nickel - cadmium cell ? State its one merit and one demerit over lead storage cell . Write overall reaction that occurs during discharging of this cell .

23. Methanol is also known as ' wood spirit ' was produced by destructive distillation of wood . It is a colourless liquid and boils at 337 K . It is highly poisonous in nature .

(i) How is methanol manufactured these days ? Give chemical equation

(ii) Why is methanol a clean fuel ?

(iii) Why is methanol used in paints , varnishes etc.?

(iv) Why should we not drink even small quantity of methanol ?

24. (a) Give reasons :

(i) Bond angle in  $\text{PH}_4^+$  is higher than that in  $\text{PH}_3$  .

(ii) Phosphorus has a greater tendency for catenation than Nitrogen .

(iii)  $\text{NF}_3$  is an exothermic compound where as  $\text{NCl}_3$  is endothermic compound .

(b) Complete the following reactions :

(i)  $\text{P}_4 + \text{NaOH} + \text{H}_2\text{O} \rightarrow$  (ii)  $\text{I}_2 + \text{Conc. HNO}_3 \rightarrow$

**OR**

(a) Give reasons :

(i) Pentahalides are more covalent than trihalides .

(ii)  $\text{N}_2$  is less reactive at room temperature .

(iii) White phosphorus is more reactive than red phosphorus .

(b) Draw the structure of the following molecules :

(i)  $\text{H}_4\text{P}_2\text{O}_7$

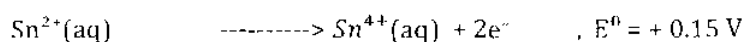
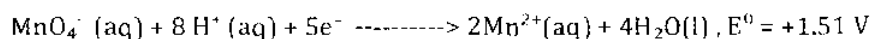
(ii)  $(\text{HPO}_3)_3$

25. (a) Define the following terms : (i) molar conductivity (ii) Faraday's second law of electrolysis

(b) A Voltaic cell is set up at 25°C with the following half cells  $\text{Al}^{3+}$  (0.001 M) and  $\text{Ni}^{2+}$  (0.50M). Write an equation for the reaction that occurs when the cell generates an electric current and determine the cell potential (Given  $E^\circ \text{Ni}^{2+}/\text{Ni} = -0.25 \text{ V}$   $E^\circ \text{Al}^{3+}/\text{Al} = -1.66 \text{ V}$ )

OR

(a) How molar conductivity changes with change in concentration of solution for a weak and a strong electrolyte  
(b) Two half - reactions of an electrochemical cell are given below :



Construct the redox reaction and find  $\Delta_r G^\circ$ . Also predict that the reaction is reactant favoured or product favoured.

26.(a) Non - ideal solutions exhibit either positive or negative deviations from Raoult's law. What are these deviations and how are they caused ?

(b) A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the freezing point of a 5% glucose in water if freezing point of pure water is 273.15 K.

OR

(a) State the following :

(i) Henry's law about solubility of a gas in a liquid.

(ii) Ebullioscopic constant.

(b) A solution prepared by dissolving 1.25 g of oil of winter green (methyl salicylate) in 99.0 g of benzene has a boiling point of 80.31 °C. Determine the molar mass of this compound.

(B.P. of pure benzene = 80.10 °C and  $k_b$  for benzene = 2.53 °C kg mol<sup>-1</sup>)