

KV, KOLLAM  
HALF YEARLY EXAMINATION, SEPTEMBER 2016  
CHEMISTRY, CLASS 12

MAX. MARKS 70

TIME 3 HOURS

GENERAL INSTRUCTIONS

- All questions are compulsory
  - Question Numbers 1 to 5 are very short answer questions and carry one mark each.
  - Question Numbers 6 to 10 are short answer questions and carry three marks each.
  - Question Number 23 is a value base question and carry four marks.
  - Question Numbers 24 to 26 are long answer questions and carry five marks each.
1. Define Lattice point and unit cell.
  2. What is an Azeotropic mixture.
  3. Enthalpy of Chemisorption is much higher than physisorption. How?
  4. Give an example for a Pseudo order reaction.
  5. What is SHE? what is its use.
  6. Ionization enthalpy of group 15 elements are higher than that of group 16 elements. Why?
  7. Write any two applications of Kohlrausch's law.
  8. Differentiate between order and molecularity of a reaction.
  9. What is the difference between Schottky defect and Frenkel defect.

Or

What is meant by (a). Ferromagnetism, (b). Ferrimagnetism.

10. Discuss the molecular shape of  $SF_6$  on the basis of VSEPR Theory.
  11. Explain the following (a). Electro dialysis, (b). Multi Molecular Colloids, (c). Peptization.
  12. Give reason (a). Penta halides are more covalent than trihalides. (b).  $ICl$  is more reactive than iodine. (c).  $PCl_3$  fumes in moisture.
  13.  $[Cr(NH_3)_6]^{3+}$  is paramagnetic while  $[Ni(CN)_4]^{2-}$  is diamagnetic explain. (atomic number of Cr=24, Ni=28)
  14. An element has a body centered cubic structure with a cell edge of 288pm, the density of the element is  $7.2g/cm^3$ , how many atoms are present in 208g of the element.
- Or
- Analysis shows that Nickel Oxide has formula  $Ni_{0.98}O_{1.00}$  What fraction of Nickel exist as  $Ni^{2+}$  and  $Ni^{3+}$ .
15. Explain Homogenous and Heterogeneous Catalysis with suitable examples.
  16. (a) How do liquation differ from distillation. (b). Where we can apply Vapor phase refining.
  17. What is the significance of leaching in the extraction of Aluminum, explain with relevant equations.
  18. What is Lanthanide contraction? what are its consequences.
  19. Represent the cell in which the following reaction takes place



Calculate its  $E_{(cell)}$  if  $E^{\ominus}_{(cell)} = 3.17 V$

20. Tetrahedral coordination entities are generally having high spin configuration. Why?
21. A first order reaction takes 40 mins for 30% decomposition calculate  $t_{1/2}$ .
22. At 300K, 36g of glucose present in a liter of its solution has an osmotic pressure of 4.98bar. if the osmotic pressure of the solution is 1.52 bars at the same temperature what would be its concentration?
23. Wasim went to purchase bricks to build his house from a brick manufacturing unit he was shocked after seeing a lot of smoke and dust coming out of the chimney which causes pollution in the near by area he decided to do something about it. Now answer the following questions.
  - (1) What type of colloidal system is smoke.
  - (2) As a chemist which processes will you suggest the manufacturing unit owner to manage smoke and gases
  - (3) How is artificial rain caused.
  - (4) Write the values shown by Wasim.

24.	<p>a Assign reason for the following</p> <ol style="list-style-type: none"> <li>Transition metal ions are usually coloured.</li> <li>Transition elements and their compounds exhibits paramagnetism.</li> <li>Transition metals form interstitial compounds.</li> </ol> <p>b. What is the effect of increasing PH of a solution of potassium dichromate.</p>	5marks
OR		
	<p>a Account for the following :</p> <ol style="list-style-type: none"> <li>Transition elements exhibit high enthalpies of atomization.</li> <li>Of the <math>d^4</math> species, <math>Cr^{2+}</math> is strongly reducing while <math>Mn^{3+}</math> is strongly oxidizing.</li> <li>Transition elements and compounds are good catalyst.</li> </ol> <p>b. Write chemical equations for the reactions involved in the manufacture of potassium permanganate from pyrolusite.</p>	
25.	<p>a) Write the formula of the following coordination compounds.</p> <ol style="list-style-type: none"> <li>Tetra carbonyl Nickel (0)</li> <li>Potassium tetra hydroxide zincate(II)</li> </ol> <p>b) <math>200\text{cm}^3</math> of an aqueous solution of a protein contains 1.26 g of the protein the osmotic pressure of such a solution at 300K is found to be <math>2.57 \times 10^{-3}</math> bar. Calculate the molar mass of the protein.</p>	5marks
OR		
	<p>a) Draw the structure of the geometrical isomers of <math>[Fe(NH_3)_2(CN)_4]^-</math></p> <p>b) If <math>N_2</math> gas is bubbled through water at 293K how many millimoles of <math>N_2</math> gas would dissolve in 1 liter of water. Assume that <math>N_2</math> exerts a pressure of 0.987 bar. Given that Henry's law constant for <math>N_2</math> at 293K is 76.48 K bar.</p>	
26.	<p>a. Account for the following</p> <ol style="list-style-type: none"> <li><math>PH_3</math> has lower boiling point than <math>NH_3</math></li> <li>Sulphur is a solid but Oxygen is a gas at room temperature</li> <li>Phosphinic acid behaves like a monoprotic acid</li> </ol> <p>b. Draw the structure of the following</p> <ol style="list-style-type: none"> <li><math>XeO_3</math></li> <li><math>XeOF_4</math></li> </ol>	5marks
OR		
	<p>a. Assign reason for the following</p> <ol style="list-style-type: none"> <li>In solid state <math>PCl_5</math> behaves as an ionic species</li> <li><math>HI</math> is more stronger acid than <math>HF</math></li> <li><math>SiF_6^{2-}</math> is known but <math>SiCl_6^{2-}</math> is not known.</li> </ol> <p>b. i. Draw the structure of per chloric acid (<math>HOClO_3</math>).</p> <p>ii. Write the outer electronic configuration of Cr atom. (<math>z=24</math>)</p>	