Name: …….

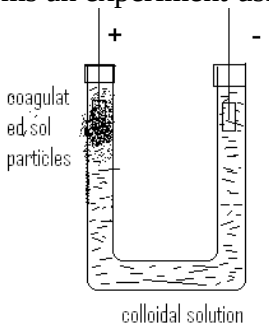
GOVT. H.S.S. ALAMCODE
MODEL EXAMINATION - FEB 2012

HSE II Max Score:60

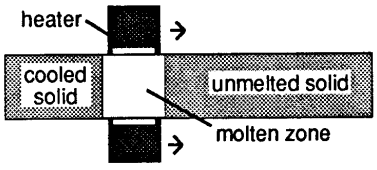
CHEMISTRY Time: 2 Hours

1. Stoichiometric defects do not disturb the ratio of cations and anions in a solid.
   (a) Name the defect which affects density of crystals (1 Score)
   (b) Explain the above defect using a diagram and provide an example (2 Score)
   (c) What happens when KCl crystal is heated in and atmosphere of K vapours? (1 Score)
2. Solution is a homogeneous mixture of two or more components.
   (a) Mixing of two liquids results in the formation of a solution that is relatively cooler than the components. What do you conclude form this observation? Explain. (2 Score)
   (b) A solution containing 8g of a substance in **100g** of diethyl ether boils at **36.86°C** , where as pure ether boils at **35.6 °C**. Determine the molecular mass of the solute. Kb for ether is **2.02** $Kkgmol^{-1}$ (2 Score)
3. It is impossible to find the absolute value of electrode potential of a single electrode.
   (a) Name a reference electrode which is helpful in the determination of electrode potential. (1 Score)
   (b) Explain the construction and working of the above electrode. (3 Score)

4.(a) The rate for the hydrolysis of esters in acid solution generally takes the form **– d[R]/dt = k[R**], where R represents the ester. Derive and expression for the rate constant **k** of such reactions. (3 Score)
   (b) Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction. (1 Score)
5. A surface chemist performs an experiment using the following equipment.



   (a) Name and explain the phenomena that you observe. (1 Score)
   (b) What is the purpose of the above experiment? (1 Score)
   (c) Identify the target electrode of $Fe(OH)_3$ sol, As_2S_3 sol and starch during the above experiment. (1 Score)
6. Metals are extracted and purified by different techniques.
   (a) Describe a method for refining Nickel. (2 Score)
   (b) Identify the process given below used for refining metals. (1 Score)



7.(a) Account for the following.

(i) N_2 is less reactive at room temperature.

(ii) Bleaching action of Cl_2.

(iii) NH_3 form Hydrogen bond but PH_3 doesnot. (3 Score)

(b) Classify the following oxides based on their acidic/ basic properties.

CO_2, CO, MgO, Al_2O_3, NO, CaO, SO_3, Na_2O. (2 Score)

8. A list of transition metal ions are given.

Ti^{2+}, Sc^{3+}, Cr^{2+}, V^{2+}, Mn^{2+}, Fe^{2+}

. (a) Arrange the ions in the increasing order of their magnetic moment. (2 Score)

(b) Identify the ions which are colourless. Give reasons. (2 Score)

9. A and B are two isomeric co-ordination compounds with molecular formula $CoCl_3.6H_2O$.

A gives 2 moles of AgCl and B gives 3 moles of AgCl with $AgNO_3$ solution.

(a) Write the structural formula of A and B (1 Score)

(b) Give the IUPAC names of A and B (2 Score)

(c) What types of isomers are A and B. (1 Score)

10.(a) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN form
. isocyanides as the chief product. Why? (1 Score)

(b) Bromoethane when treated with alc. KOH gives ethene ,KBr and H_2O.

(i) Identify the types of reaction. (1/2 Score)

(ii) Instead of Bromoethane , if you take 2-bromobutane , what is the major product obtained? Write down the chemical equation for the reaction. (1 1/2 Score)

(iii) Explain the rule behind the above reaction. (1 Score)

11. Explain the following reaction with equations.

(a) Reimer-Tiemann reaction (2 Score)

(b) Kolbe's reaction (2 Score)

12. (a) Identify the name of the chemical reactions given below.

(i) $CH_3\text{-}COCl + H_2 \xrightarrow{Pd/BaSO4} CH_3CHO + HCl$

(ii) $C_6H_5\text{-}OH + [O] \xrightarrow{CrO2Cl2} C_6H_5\text{-}CHO + H_2O$

(iii) $C_6H_6 \xrightarrow{CO,HCl/An.hyd.AlCl_3} C_6H_5\text{-}CHO$ (3 Score)

(b) Suggest a method to distinguish between acetaldehyde and benzaldehyde. (2 Score)

13. Explain a test to distinguish between
$CH_3\text{-}NH_2$, $(CH_3)_2NH$ and $(CH_3)_3N$. (3 Score)

14. (a) What is denaturation of protein (1 Score)

(b) Draw the cyclic structure of **α-D-(+)- glucopyranose**. (1 Score)

(c) Write the important function of nucleic acids. (1 Score)

15. (a) Write the differences between thermoplastics and thermosetting plastics. (2 Score)

(b) Write the monomers used for the preparation of Nylon – 66. (1 Score)

16. (a) Distinguish between Antiseptics and Disinfectants. (2 Score)

(b) What are antifertility drugs? Give one example. (1 Score)