

**FACULTY OF SCIENCE****B.Sc. II – Year Examination, March / April 2016****Subject : CHEMISTRY****Paper – II****Time : 3 hours****Max. Marks : 100****Part – A (4 X 15 = 60 Marks)****(Essay Answer Type)****Note : Answer all questions, choosing any two bits from each question.****Each bit carries 7 ½ marks.**

- 1 a) Write a note on variable oxidation states, color and magnetic behaviour of d-block elements.  
b) Define Lanthanide contraction its causes and at least two consequences.  
c) Explain valence bond theory of bonding in metals and write its drawbacks.  
d) Define EAN. Give the structures of  $[\text{Fe}(\text{CO})_5]$  and  $[\text{Cr}(\text{CO})_6]$  and calculate their EAN.
- 2 a) Explain the mechanism and stereochemistry and kinetics of  $\text{SN}^2$  reaction by taking 2-bromo pentane as example.  
b) Explain the comparison of hydrolysis of alkyl, benzyl, allyl, vinyl and aryl halides.  
c) Write the action of phenols with  $\text{FeCl}_3$ , and acetophenone with Fehlings reagent.  
d) Discuss Benzoin and aldol condensation with example.
- 3 a) Explain the reasons for elevation of boiling points of a solution derive the expression between elevation of boiling points and relative lowering of vapour pressure.  
b) Derive Nernst equation to calculate single electrode potential.  
c) Define Triple point and metastable equilibrium explain the significance of triple point.  
d) Define the terms i) Specific conductance ii) Equivalent conductance  
iii) Molar conductance and give their units.
- 4 a) Describe the principles of gravimetric analysis with example.  
b) Define accuracy and precision explain their determination with suitable example.  
c) Write the principle of complexometric titration with suitable example.  
d) Explain rotational axis of symmetry and give molecular examples for  $C_\infty$ ,  $C_2$ ,  $C_3$ ,  $C_4$ , and  $C_6$  axis of symmetry.

**Part – B (8 X 5 = 40 Marks)**  
(Short Answer Type)

**Note : Answer all questions.**

- 5 a) Explain the structure, hybridization and bonding in Ferrocene.

**OR**

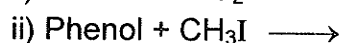
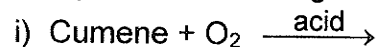
- b) Write a note on n-type and P-type semi conductors.

- 6 a) Give two examples of metal nitrosyls and give their structures.

**OR**

- b) Write the similarities and dissimilarities between lanthanides and actinide.

- 7 a) Complete the following reactions and giving their products.



**OR**

- b) Write Pinacol-Pinacolone rearrangement reaction with example.

- 8 a) Write Haloform reaction with example and write its importance.

**OR**

- b) Explain claisen condensation with mechanism and example.

- 9 a) Define osmotic pressure and isotonic solutions and explain Vant Hoff factor.

**OR**

- b) The specific conductance of 0.01N acetic acid is 0.00016 ohm<sup>-1</sup> cm<sup>1</sup>. Find the degree of dissociation of acetic acid in percentage.

- 10 a) Explain the two methods suggested by Debye and Huckle for decreasing the conductance of strong electrolytes with increasing concentration.

**OR**

- b) Explain reference electrodes and reversible electrodes with an example.

- 11 a) What are potentiometric titrations and explain one important application?

**OR**

- b) Define precipitation, co-precipitation and post precipitation with examples.

- 12 a) Explain stereoselective reaction with an example.

**OR**

- b) Write molecular orbital symmetry properties of 1, 3-butadiene with HOMO and LUMO configuration.

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