

Vidya Prasarak Mandal's
B. N. Bandodkar college of science, Thane-400 601.
Preliminary examination, Feb-2012.
T. Y. B. SC.
Chemistry-II

Day:

TIME: 3 hrs

Date: 0 -02-2012

MARKS: 100

N.B.: 1) All questions are compulsory

2) Figures to the right indicate full marks.

3) Use of log tables/non-programmable calculator is allowed

Q1. Answer the following:

a n' type semiconductor on the basis of molecular orbital theory. 3

OR

a Explain the term symmetry element and symmetry operation with suitable examples. 3

b Give structure of borazine with bond length and bond angle? 3

OR

b What is $10 Dq$? 3

c The density of hafnium is nearly double than that of Zirconium 3

d What is BOD? give its importance? 3

e Importance of solid state Chemistry 2

f Give the classification of solids on the basis of bonding 2

g What is Spin selection rule? 2

OR

g What are nonaqueous solvents? 2

h What is forced configuration? 2

OR

h What is meant by delta-bonding 2

Q 2 a Show that the 'Atomic packing Factor' for a face centered cubic (fcc) lattice is $\pi/3\sqrt{2}$ or 0.74% 5

OR

a Discuss the structure of zinc blende. 5

Attempt any three of the following:.

b Discuss the proper rotation axis' with a suitable example 5

c What is Walsh correlation diagram ? Explain its use with a suitable example 5

d Give the applications of superconducting materials 5

e Explain the point groups i) C_{3v} and ii) D_{3h} with a suitable example of each 5

Q 3

a What is lanthanide contraction? Discuss the consequences of lanthanide contraction 5

OR

a Discuss the principles involved in the separation of lanthanides by solvent extraction method 5

Attempt any three from the following:

b What is meant by a 'predominance diagram'? 5

c What are i) Protic ii) Aprotic iii) Amphoteric Solvents? Explain with suitable example 3
2

d Give the preparation, properties and uses of plutonium 5

e Explain the redox reactions in liquid ammonia solvent. 5

Q 4

a Explain crystal field splitting in octahedral complexes 5

OR

a Explain the use of electronic spectra to:- 5

(i) distinguish cis-trans isomerism (ii) determine the geometry of complexes

Attempt any three of the following

b Write note on Russell-Saunders' coupling 5

c What is the role of metal ion in deciding the thermodynamic stability of the complex ? 5

d Draw a neat labelled molecular orbital diagram for hexacyano ferrate (II) ion showing distribution of electrons in various molecular orbitals. Comment on its Δ_o value and magnetic behaviour 5

e Write a note on anation reaction 5

Q 5

a Explain sedimentation and coagulation with reference to removal of solid waste from liquid effluent 5

OR

a What are organometallic compounds? Explain any two methods of preparation of organometallic compounds. 5

Attempt any three of the following

b Explain preparation of nanoparticles by (i) Colloidal route method (ii) Sol-gel method 5

c (i) What are cathartics? How are they classified? (ii) Explain antacids. Give examples? 5

d Explain hydroformylation reaction with Roelen catalyst. 5

e With reference to ferrocene, give one method of preparation, three chemical properties and one use. 5