

(6 pages)

Reg. No. :

Code No. : 6381

Sub. Code : HCHM 12

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2013.

First Semester

Chemistry

INORGANIC CHEMISTRY – I

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The ion that isoelectronic with CO is

(a) CN^- (b) O_2^+

(c) O_2^- (d) N_2^+

2. Which one among the following does not have the hydrogen bond?

(a) phenol (b) liquid NH_3

(c) water (d) liquid HCl

3. The bonds present in N_2O_5 are

(a) only ionic

(b) covalent and coordinate

(c) only Covalent

(d) covalency and Ionic

4. The bond between two identical non-metal atoms has a pair of electrons :

(a) unequally shared between the two

(b) transferred fully from one atom to another

(c) with identical spins

(d) equally shared between them

5. The number of close neighbor in a body-centred cubic lattice of identical sphere is

(a) 8 (b) 4

(c) 6 (d) 2

6. In which of the following substances the carbon atom is arranged in a regular tetrahedral structure?

(a) Diamond (b) Benzene

(c) Graphite (d) Carbon black

Page 2

Code No. : 6381



7. A crystalline solid have,
(a) Long range order
(b) Disordered arrangement
(c) Short range order
(d) None of these
8. Glass is
(a) Supercooled liquid
(b) Amorphous solid
(c) Crystalline solid
(d) Liquid crystal
9. In lanthanides the last electron enters $(n - 2) f$ sub shell where n is equal to
(a) 4 (b) 5
(c) 6 (d) 7
10. The $4f$ – electrons do not affect the properties of lanthanides because they
(a) are inactive in nature
(b) are all paired
(c) lie well in the interior of the atom
(d) lie well in the interior of the atom and hence not exposed to surroundings

Page 3

Code No. : 6381

SECTION B — $(5 \times 5 = 25 \text{ marks})$

Answer All the questions, choosing either (a) or (b).

11. (a) Explain hybridization with suitable example.

Or

- (b) Describe Bent's rule.

12. (a) Describe lattice energy in detail.

Or

- (b) How covalent character is determined in ionic compounds?

13. (a) How conductors are distinguished from insulators?

Or

- (b) What are semiconductors? Give its three important applications.

14. (a) What is X-ray diffraction?

Or

- (b) Explain the crystal structure of calcite and K_2NiF_4 .

Page 4

Code No. : 6381

[P.T.O.]



15. (a) Describe the chemistry and separation of Np from U and fission products.

Or

- (b) What are common and uncommon oxidation states?

SECTION C — ($5 \times 8 = 40$ marks)

Answer All the questions, choosing either (a) or (b).

16. (a) Describe the basic assumptions of VSEPR theory with suitable examples.

Or

- (b) Explain with suitable examples of the geometrical isomerism in octahedral complexes.

17. (a) Describe the general properties and classification of solvents in detail.

Or

- (b) Describe with suitable examples of the chemical reactions in non aqueous solvents.

18. (a) What is photovoltaic effect and how it works?

Or

- (b) Discuss the preparation and properties of nonstoichiometric compounds.

Page 5 Code No. : 6381

19. (a) How will you compare the electron and X-ray diffractions?

Or

- (b) Write the crystal structure of following compounds : ($4 \times 2 = 8$)

- (i) Calcite
- (ii) perovskite
- (iii) CsCl
- (iv) Wurtzite.

20. (a) How will you compare the transition metals with lanthanides and actinides.

Or

- (b) (i) Why are the lanthanides and actinides separate on the periodic table? (4)
- (ii) What are the similarities between the actinide and lanthanides? (4)

Page 6 Code No. : 6381



(6 pages)

Reg. No. :

Code No. : 6382

Sub. Code : HCHM 13

M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2013.

First Semester

Chemistry

PHYSICAL CHEMISTRY – I

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Variation of chemical potential with pressure is given by
(a) RT/p (b) p/RT
(c) RTP (d) R/TP
2. Partial molar property was introduced by
(a) G.N. Lewis (b) Faraday
(c) Avogadro (d) Einstein

3. Entropy production is the sum of the products of forces and _____.
(a) Fluxes (b) Energy
(c) Matter (d) Enthalpy
4. Non-Equilibrium thermodynamics is applicable to
(a) Irreversible process
(b) Reversible process
(c) Non spontaneous process
(d) Isothermal process
5. At quintuple point the number of phases existing in equilibrium is
(a) 4 (b) 5
(c) 6 (d) 3
6. The method of representing 3 component system on a paper was developed by
(a) Stokes and Roozeboon
(b) Stark-Einstein
(c) Beer-Lambert
(d) Susai-Rose

Page 2

Code No. : 6382

