April 2017

Seat Number

3	3	2	8	5	5

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गुरु - 032

CHEMISTRY PAPER - I : CH-231
Physical & Inorganic Chemistry
(231301)

P. Pages : 3

Time : Two Hours **Max. Marks : 60**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Use of logarithmic table and non-programmable calculator is allowed.
6. Draw a neat diagram wherever necessary.
7. Figures to the right indicate full marks.

1. A) Attempt **any six** of the following **6**

i) The relation between Gibbs free energy and Helmholtz free energy is ----------.

a) $\Delta G = \Delta A - P\Delta V$ b) $\Delta G = \Delta A + P\Delta V$

c) $\Delta G = \Delta A - T\Delta S$ d) $\Delta G = \Delta A + T\Delta S$

ii) The free energy change for spontaneous process is ----------.

a) Negative b) Positive

c) Zero d) None of these

iii) The change in free energy is a measure of

a) Net work done b) Net change in entropy

c) Net change in enthalpy d) Net change in internal energy

iv) Phenol-water system exhibits ---------- system.

a) maximum CST b) Minimum CST

c) Without CST d) Both Maximum as well as minimum CST

v) Solutions which distill without change in composition or temperature are called ---------

a) Unsaturated solution b) Saturated solution

c) ideal solution d) Azeotropic mixture

vi) In the first transition series the highest oxidation state is shown by ----------.

a) Mn b) Cr
c) Fe d) Ni

vii) The metal ion which is not coloured is ----------.

a) Fe^{3+} b) V^{2+}
c) Zn^{2+} d) Ti^{3+}

viii) Aluminum is corroded only in ----------.

a) Distilled water b) Water containing salt
c) Hot water d) All of the above

B) Answer in one sentence each **any six.** 6

i) Define Helmholtz free energy.

ii) Define activity.

iii) Give the relation between ΔG and ΔH.

iv) Define the term molality.

v) Define non-ideal solution.

vi) Give the electronic configuration of manganese.

vii) Give the catalyst used in contact process of H_2SO_4 manufacture.

viii) Define the term electrometallurgy.

2. Attempt **any six** of the following. 12

i) Explain the term fugacity.

ii) Give the physical significance of ΔG.

iii) Give variation of $(\Delta A/_T)$ with temperature at constant volume.

iv) State Raoult's law.

v) Define fractional distillation.

vi) Define ideal-solution with example.

vii) What is ionisation energy.

viii) Why Zn Cd and Hg are not called transition elements.

ix) Define conductor and Insulator.

3. Answer **any four** of the following. 12

i) Explain metallic bonding.

ii) Explain the reducing property of Al.

iii) Explain standard free energy of formation of a compound.

iv) Explain diamagnetic and paramagnetic substances.

v) Describe p-type semiconductor.

vi) Where does bauxite ore occur in India?

4. Answer **any three** of the following. 12

i) Calculate the free energy change accompanying a compression of two moles of carbon dioxide at 60°C from 25 atm. to 300 atm. pressure.

[R= 1.987 cal. deg^{-1} $mole^{-1}$]

ii) 5.25 gm of sodium chloride dissolved in 1000 gm of water. Calculate mole fraction of sodium chloride and that of water. [molecular weight of NaCl=58.5]

iii) Why the transition metals have tendency of forming complex compound?

iv) Explain the magnetic properties of transition metals.

v) Give uses of Aluminum.

5. Attempt **any two** of the following. 12

i) Derive clausius-clapeyron equation for vapour pressure of liquids and give its applications.

ii) Explain the term critical solution temperature. Discuss phenol-water system with neat diagram.

iii) Discuss the following properties of transition elements with reference to

i) Metallic character.
ii) Atomic and Ionic radii.
iii) Reactivity.

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