Seat Number

April-2016

कांचन - 004

# CHEMISTRY PAPER - I : CHE-241
# Physical Chemistry & Inorganic Chemistry - II
## (24135)

P. Pages : 2

Time : Two Hours

Max. Marks : 40

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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. Programmable calculators are not allowed.
6. Figures to the right indicate full marks.
7. Draw the neat diagram wherever necessary.

1. a) Multiple choice questions : 4

i) The clausius – clapeyron equation helps to calculate.
   a) Latent heat of vaporization
   b) Boiling point or Freezing point
   c) Vapour pressure at one temperature, if at another temperature is given
   d) All of the above

ii) What occurs when an atom is oxidized in a chemical reaction.
   a) A loss of electrons & a decrease in oxidation number
   b) A loss of electrons and an increase in oxidation number
   c) A gain of electrons and a decrease in oxidation number
   d) A gain of electrons and an increase in oxidation number

iii) The properties of Zr and Hf are similar because.
   a) Both have same atomic radii
   b) Both belongs to same series
   c) Both belongs to 'd' block
   d) Both have same number of electrons

iv) The MO's formed as a result of LCAO method obey.
   a) Paulis exclusion principle
   b) Aufbau principle
   c) Hunds rule of maximum multiplicity
   d) All of them

b) Attempt **any two** of the following. 4
   i) Give physical significance of $\Delta G$.
   ii) Explain P-d combination of orbitals.
   iii) What is misch metal ?

2. Attempt **any two** of the following. 8
   i) Derive Van't Hoff reaction isotherm.
   ii) Explain amalgum electrode.
   iii) $La(OH)_3$ is a stronger base while $Lu(OH)_3$ is weaker base. Why ?

3. a) Answer **any one** of the following. 4
   i) Calculate the standard free energy change for the reaction.
   $4NH_{3(g)} + 5\ O_{2\ (g)} = 4NO_{(g)} + 6H_2O(\ell)$.
   The standard free energy of formation of
   $NH_3$, NO, $H_2O$ are -3.9, 20.7 and -56.7 K cal. $Mole^{-1}$ respectively.

   ii) Write the cell reaction and calculate EMF of the cell.
   $\overset{\ominus}{Zn}\,|Zn^{+2}$ (a=0.1M) $||Ag^{+}$ (a=0.05m) $|\ \overset{\oplus}{Ag}$ at 25°C.
   Given, E° Zn (oxd) = 0.763 V.
   E° Ag (oxd)= - 0.799 V.

   b) Answer **any one** of the following. 4
   i) Discuss separation of lanthanides from one another by solvent extractions.
   ii) Distinguish between BMO's and ABMO's.

4. Answer **any two** of the following. 8
   i) Describe the construction and working of the calomel electrode. Give its advantages.
   ii) On the basis of MOT, explain the formation of No molecule. Calculate bond order and stabilisation energy.
   iii) Discuss preparation of actinides using heavy ion bombardment.

5. a) Answer **any one** of the following. 6
   i) Derive Clausius – Clapeyron equation for vapour pressure of liquids and give its applications.
   ii) Give assumptions of MOT.

   b) State the conditions for the standard cell. 2

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