Oct-2014

कदंब - 023

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

P. Pages : 2

Time : Two Hours **Max. Marks : 40**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same 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 Sign of ΔG for non-spontaneous process is _____.
   a) Zero b) Positive
   c) Negative d) both positive and negative

ii) Weston cell is the example of _____.
   a) Standard cell b) Secondary cell
   c) SHE d) Irreversible cell

iii) The Bond order of N_2 molecule is _____.
   a) 2 b) 3
   c) δ M.O.S d) all of these

iv) In actinides the sub-shell which gradually filled is _____.
   a) 4f b) 5f
   c) 4d d) 5d

b) Attempt **any two** of the following. **4**

i) Define the term Fugacity and Activity.

ii) Define homo and hetero nuclear diatomic molecules.

iii) Give any two uses of Lanthanides.

2. Attempt **any two** of the following. 8

i) Derive Clapeyron equation.

ii) What is the secondary reference electrode? Describe Saturated Calomel electrode.

iii) Draw the Flow sheet diagram for extraction of Ln's from Monazite Sand.

3. a) Answer **any one** of the following. 4

i) Two moles of an ideal gas at 330 K and 3.5 atm. are compressed isothermally and reversibly to 15.8 atm. Calculate Gibb's free energy change for compression $(R = 8.314 JK^{-1})$.

ii) The emf of the cell $Zn/ZnSO_4$ 110.1NKCl/Hg_2Cl_2(S)/Hg was found to be 1.094 volts at 25^0C. Determine the oxidation potential of zinc electrode on the hydrogen scale at 25^0C.

b) Answer **any one** of the following. 4

i) Explain preparation of actinides by using Heavy ion bombardment.

ii) Distinguish between bonding molecular orbital and antibonding molecular orbital.

4. Answer **any two** of the following. 8

i) Give Limitations of the hydrogen electrode.

ii) Draw M. O. energy level diagram of O_2 molecule and calculate bond order.

iii) Explain the effect of Lanthanide contraction on post Lanthanides.

5. a) Answer **any one** of the following. 6
i) Derive Vant-Hoff reaction isotherm for a chemical reaction.
ii) Explain on the basis of MOT the formation of Co molecule.

b) Define emf of cell and give its unit. 2

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