KIIT UNIVERSITY, BHUBANESWAR

MID SEMESTER(SPRING) EXAMINATION-2014

SUBJECT :- CHEMISTRY

TIME :- 2 HOURS FULL MARK :- 25

(Answer any **FIVE** questions including **Question No. 1** which is **compulsory.**)

(The figures in the right hand margin indicate marks)

Q.1 [1X5]

(a) The de Broglie wave length of a particle is λ at 927^0C. Find its wave length at 27^0C.

(b) Tetrahedral complexes are high spin complexes- explain.

(c) Arrange the following in the increasing order of their bond orders.

O_2 , O_2^+ , O_2^- , O_2^{+2} , O_2^{-2}.

(d)What is EAN Rule ? Calculate magnetic moment of $K_4[Fe(CN)_6]$ on the basis of this rule.

(e) Calculate the minimum energy required to promote an electron from its ground state in a one dimensional box of length 1 A^0.

Q.2. [2.5 X2]

(a) On the basis of VBT find the geometry, type of hybridization and magnetic moment of $[Cu(NH_3)_4]^{+2}$ ion.

(b) Calculate the wave length of a moving electron having kinetic energy of 5.55×10^{-25} J.

Q.3 [2.5X2]

(a)What do you mean by bonding & anti-bonding molecular orbitals ? Draw the M.O. diagram of HF molecule and find its bond order.

(b) On the basis of CFT , calculate the CFSE and magnetic moment of $[Fe(CN)_6]^{-3}$ ion.

Q.4 [2.5X2]

(a) State and explain Einstein's photo electric effect.What is threshold frequency & work function ?

(b)Calculate the uncertainty in velocity of a particle weighing 10^{-2}kg , whose position is Known with a precision of ± 0.01 mm.

Q.5 [2.5X2]

(a) State and explain Wien's displacement law and Stephen-Boltzmann Law and give their significances.

(b) Calculate the potential through which a beam of electrons be accelerated so that its wave length becomes equal to $5A^0$.

Q.6 [2.5X2]

(a)Explain why liquid oxygen sticks to the poles of a magnet but liquid nitrogen does not .

(b)Whether $K_3[Fe(CN)_6]$ is a colored or colorless complex? Explain on the basis of CFT .

Q.7 [2.5X2]

(a) What is Born approximation of a wave function ? What are eigen values & eigen functions?

(b) Electrons are emitted with zero velocity from a metal surface when it is exposed to a radiation of wave length 7000 A^0. Find the threshold frequency and work function.

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