

VITTHALBHAI PATEL & RAJRATNA P.T. PATEL SCIENCE COLLEGE
VALLABH VIDYANAGAR
INTERNAL TEST-2014

Date : 03-12-2014

B.Sc. (Semester-I)

Day : Wednesday

Time: 11.00 a.m. to 12.00 Noon

Total Marks: 25

Subject: INORGANIC CHEMISTRY (US01CCHE02)

Note: (i) All questions are to be attempted.
(ii) Figures to the right indicate marks.

Q: 1 Answer the following multiple choice questions :

[03]

- (i) What is the symbol of Hamiltonian operator?
(a) \hat{H} (b) Δ (c) H (d) ∇
- (ii) Which molecule do not follow the octet rule?
(a) Cl_2 (b) NH_3 (c) HF (d) BF_3
- (iii) What is the bond order of H_2 molecule?
(a) 0 (b) 1 (c) 1.5 (d) 2.5



Q: 2 Answer the following (ANY TWO):

[04]

- (i) Define intervening electrons and shielding effect.
(ii) Give the shape of CH_4 , SF_6 , ClF_3 and PCl_5 molecule.
(iii) Why He_2 does not exist?

Q: 3 (a) Derive de-Broglie's wave equation.

[03]

- (b) Calculate the screening constant and effective nuclear charge on 4s electron of Mn ($Z=25$).

[03]

OR

Q: 3 (a) Give the Slater's rule for calculating σ and Z_{eff} .

[03]

- (b) A cricket ball weighing 100 gms is to be located within 0.1 \AA . What is the uncertainty in its velocity ?

[03]

Q: 4 (a) Discuss the Sidgwick-Powell theory to predict the shape of molecules.

[03]

- (b) Define hybridization. Discuss the sp - hybridization in BeF_2 molecule.

[03]

OR

Q: 4 (a) Using VSEPR theory, predict the geometry of NH_3 and H_2O molecule.

[03]

- (b) I_3^- ion has linear shape. Explain by VSEPR theory.

[03]

Q: 5 (a) Describe LCAO method to obtain wave function of molecular orbital.

[03]

- (b) Describe molecular treatment of F_2^- molecule.

[03]

OR

Q:5 (a) Distinguish between bonding orbital and antibonding orbital.

[03]

- (b) Explain s-p combination of orbitals.

[03]
