

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

Date : 03-12-2014

Day : Wednesday

Time: 11.00 a.m. to 12.00 Noon

B.Sc. (Semester-I)

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)  $\Delta$  (c)  $H$  (d)  $\nabla$
- (ii) Which molecule do not follow the octet rule?  
(a)  $\text{Cl}_2$  (b)  $\text{NH}_3$  (c)  $\text{HF}$  (d)  $\text{BF}_3$
- (iii) What is the bond order of  $\text{H}_2$  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  $\text{CH}_4$ ,  $\text{SF}_6$ ,  $\text{ClF}_3$  and  $\text{PCl}_5$  molecule.
- (iii) Why  $\text{He}_2$  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  $\sigma$  and  $Z_{\text{eff}}$ .

[03]

- (b) A cricket ball weighing 100 gms is to be located within  $0.1 \text{ \AA}$ . 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  $\text{BeF}_2$  molecule.

[03]

OR

Q: 4 (a) Using VSEPR theory, predict the geometry of  $\text{NH}_3$  and  $\text{H}_2\text{O}$  molecule.

[03]

- (b)  $\text{I}_3^-$  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  $\text{F}_2^-$  molecule.

[03]

OR

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

[03]

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

[03]

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