

SARDAR PATEL UNIVERSITY**M.Sc. (Integrated) Biotechnology, Third Semester Examination****Monday, 25th April****2016****10.30 a.m. to 1.30 p.m.****Physical - Inorganic Chemistry: PS03CIGB01****Total Marks: 70****Note : (i) All questions are to be attempted. (ii) Figures to the right indicate marks.****Q.1 Choose the correct option for the following : 08**

- (i) Carbon atom of CH_4 is hybridized.
 (a) sp^2 (b) sp^3 (c) sp (d) dsp^3
- (ii) Dative bond is also known as bond.
 (a) strong (b) weak (c) hydrogen (d) co-ordinate.
- (iii) Study of rate of reaction belongs to.....
 (a) thermodynamics (b) chemical kinetics (c) pH (d) concentration
- (iv) Half life time is denoted as,
 (a) T (b) t (c) K (d) $t_{1/2}$
- (v) In homogeneous catalysis reaction, reactant and catalyst are in the
 (a) same state (b) different state (c) solid state only (d) liquid state only
- (vi) Calcium is an important for
 (a) ion balance (b) oxygen transfer (c) bone structure (d) electron transfer
- (vii) Which is a man made polymer ?
 (a) PVC (b) cotton (c) cellulose (d) jute.
- (viii) Milk is an example of
 (a) gel (b) sol (c) emulsion (d) coagulation

Q.2 Answer the following: (attempt any seven) 14

- (i) Define : (a) Bonding molecular orbital & (b) hybrid orbital.
- (ii) What are the main characteristics of covalent bond ?
- (iii) Define Order and molecularity of reaction with examples.
- (iv) What is meant by Half life time ? Write rate of reaction equation taking suitable example.
- (v) Discuss the role of Sodium and Iron metal ion in a biochemical processes.
- (vi) What do you mean by Heat of dilution ?
- (vii) Define : Heterogenous catalysis.
- (viii) Distinguish between : Elastic and non-elastic gels.
- (ix) Define : Homopolymers with an illustration.

Q.3**A. Define Electron affinity. Draw born Haber cycle of CsCl crystal. 06****B. Answer the following: 06**

- (i) Give main postulate of VSEPR theory. Explain the shape of H_2O and NH_3 molecules.

(P.T.O.)

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(ii) Discuss in detail about Optical isomerism in coordination complexes.

OR

B. Answer the following : 06

(i) Define hybridization. Explain the shape of BF_3 molecule.

(ii) Draw MO diagram of B_2 and N_2 molecule.

Q.4

A. Answer the following: 06

(i) Derive Kirchhoff's equation.

(ii) Discuss in detail about Zn and Cu metalloenzyme.

B. Do as directed : 06

(i) Write a note on : Heat of combustion.

(ii) State Hess law. Write applications of Hess law.

OR

B. Answer the following : 06

(i) Write a note on : Metalloporphyrine.

(ii) Discuss the role of alkali and alkaline earth metals in biology.

Q.5

A. Derive the equation for second order reaction. A second order reaction where $a = b$ is 10% completed in 30 minutes. How long will the reaction takes to be 20% completed ? 06

B. Define activation energy. Discuss about collision theory of reaction rate in detail. 06

OR

B. Define catalysis. Enlist the characteristics of catalyst in catalysis process. 06

Q.6

A. Answer the following: 06

(i) Define colloidal solution. Give any two methods of formation of colloidal sol.

(ii) Define copolymers. Give its classification with examples.

B. Explain the following terms: 06

(i) Emulsion and (ii) Peptization.

OR

B. Define polymerization. Write phenol- formaldehyde polymerization and its mechanism. 06

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