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SARDAR PATEL UNIVERSITY
M. Sc IGBT. (Semester-III) Examination
Thrusday, 29/11/2012; Time-2:30 PM to 5:30 PM
SUBJECT CODE: PS03CIGB01
SUBJECT TITLE: Physical Inorganic Chemistry

Maximum Marks: 70

Note: (1) All questions are compulsory.
(2) Figure to right indicates total marks of question.

Q-1 **Choose the correct option for the following:** 1 × 8

1. **A+ B + C → products is**
   a. Unimolecular b. Trimolecular
   c. Bimolecular d. Tetramolecular
2. **In dsp^2 hybridization the new orbitals have the following geometry**
   a. Square planer b. Tetraheadral
   c. Trigonal d. Trigonal bi pyramidal
3. **Enzymes are:**
   a. Substances synthesized by chemist to decrease the reaction rate b. Higly porous substance to activate acids and bases.
   c. Extremely poor in catalytic activity d. Catalysts found in organism.
4. **Vitamin B12 having an essential atom like:**
   a. Fe b. Mg
   c. Cu d. Co
5. **The scattering of light by the dispersed phase is called the**
   a. Electroosmosis b. Tyndall effect
   c. Adsorption d. Brownian motions
6. **Poly vinyl chloride is the example of:**
   a. Addition polymer b. Condensation polymers
   c. Both a & b d. None
7. **The heat of neutralization of strong acid and strong base is always:**
   a. Zero b. Constant
   c. Positive d. Changing
8. **Which among the following pairs are paramagnetic:**
   a. O_2 and N_2 b. O_2 and CO
   c. O_2 and NO d. CO and NO

Q-2 **Answer the following (Any Seven).** 2 × 7

1. What is Lindeman theory of unimolecular reaction.
2. Define heat capacity.
3. State Hess law of constant heat of summation.
4. Give the synthesis of Nylon 6,6 polymer.

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5. What is acid-base catalysis?
6. Write the characteristic of rate constant.
7. What are emulsions? State its type.
8. What is the role of Mg play in functioning of chlorophyll.
9. Define the term coordination compound with suitable example.

Q-3 A. Predict the shape of the following molecules and ions according to VASPER theory. 6

1. SF_6
2. ICl_2^-

B Define crystal lattice energy. Draw Born Haber cycle for NaCl crystal and $LiCl_{(s)}$ 6

OR

B. Define ionization energy. Calculate crystal lattice energy for NaCl from the following data: 6

(i) Heat of vapourization of Na = 106.35 Kj/mole
(ii) Bond dissociation energy of Cl_2 = 246.9 Kj/mole
(iii) Ionization energy of Na = 495.4 Kj/mole
(iv) Electron affinity of Cl = - 356.1 Kj/mole
(v) Heat of formation of NaCl = - 413.0 Kj/mole

Q-4 A. Derive the mathematical expression for the rate constant for second order reaction with suitable example. 6

50% of a first order reaction is completed in 23 minutes. Calculate the time required to complete 90% of the reaction.

B. What are catalysts? Explain the promotor and inhibitors with suitable examples. 6

OR

B. Explain the following 6

(i) Collision theory of bimolecular reaction
(ii) Reversible or opposing reaction.

Q-5 A. (i) What is heat of combustion and state its applications. 6

(ii) Explain the alkali and alkaline earth metals.

B. Explain the following: 6

(i) Role of Na and Mg atom in biology.

(ii) Metalloporphyrines.

OR 6

B. What is exothermic and endothermic reaction?

The heat of formation of methane at 298 K at constant pressure is - 17,890 kcal. Calculate its heat of formation at constant volume.

(Given R= 1.987 Cal. degree^{-1} mole^{-1})

Q-6 A. Give the classifications and industrial applications of polymers. 6

B. Difference between 6

(i) Thermoplastic and thermosets

(ii) Lyophilic and lyophobic solutions.

OR

B. Describe the method of preparation of colloidal solution by: 6

(i) Mechanical dispersion using colloid mill

(ii) By peptization.