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B.Sc. (Part-III) Examination, 2019

CHEMISTRY

Paper-I

(Inorganic Chemistry)

Time Allowed : Three Hours]   *[Maximum Marks : 75*

Note : Attempt **all** question as per instructions. **All** questions of a section must be answered together.

Section-A

Note : Attempt **all** questions. Give answer of each part in about 50 word. $1\frac{1}{2} \times 10 = 15$

1.   (a)   Calculate CFSE in d^5 octahedral system with strong field ligand.

    (b)   How do Δ_0 and Δt differ from each other.

    (c)   What is curie's law?.

    (d)   Define magnetic susceptibility?

    (e)   What are labile complexes?

    (f)   What are microstates?

    (g)   What is 18 electron rule?

P.T.O.

(h) How many term symbols do you expect for P^2 configuration?

(i) What are silicones?

(j) Calculate μ_s for a d^4 system?

Section-B

Note : Attempt **all** question. Give answer of each question in about 200 words. $8 \times 5 = 40$

2. How do the d- orbital energy levels splits when a transition metal ion is placed in an octahedral crystal field of ligands. Draw a neat diagram showing the splitting?

OR

What are organometallic compounds? How they are classified?

3. Describe the various physical and chemical properties of phosphonitrillic compounds?

OR

What do you know about magnetic moment? Derive relationship between magnetic moment and magnetic susceptibility?

4. Describe Pearson's concept for hard and soft-acids and bases? Write the applications of HSAB principle?

OR

Discuss the biological role of N_a^+ and K^+ ions?

5. Discuss various theories to explain the trans effect?

OR

What do you know about Curie-Weiss law? How magnetic susceptibility varies with temperature.

6. Derive a relationship between the stepwise and overall stability constant.

OR

How are cross-linked silicones prepared ? Give the important technical uses of cross -linked silicones?

Section-C

Note : Attempt any **two** questions. Give answer of each question in about 500 words.

$10 \times 2 = 20$

7. What do you know about labile and inert complexes? What are the different patways in which a ligand may replace another ligand in square planar complexes .

P.T.O

8. What is L-S coupling? Draw a neat diagram displaying all the terms in the splitting of ion with d^2 configuration.

9. (a) How dose spin only magnetic moment differ with the number of unpaired electrons.

   (b) Discuss about quenching of orbital angular momentum?

10. Show the splitting of d- orbitals in square planar complexes? How will you predict a given complex to be high spin or low spin on the basis of crystal field splitting (Δo) and pairing energy.

11. Write notes on any **three** of the followings.

    (a) What is symbiosis?

    (b) Factors affecting the magnitude of Δo.

    (c) Explain the selection rule for d-d transition.

    (d) Orgel energy level diagram for d^1 and d^9 states in tetrahedral field.

    (e) Explain the factors on which stability of metal complexes in solution depends?

    (f) How do hemoglobin and myoglobin work in the biological system.

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लुरफाबाद बछोली, बीकापुर–फैजाबाद