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X—12—2019

FACULTY OF SCIENCE

B.Sc. (Fifth Semester) (Regular) EXAMINATION

OCTOBER/NOVEMBER, 2019

(CBCS Pattern)

CHEMISTRY

Paper-XIII (Elective)

(Physical and Inorganic Chemistry)

(Friday, 15-11-2019) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) Attempt *All* questions.

(*ii*) Use of logarithmic table and non-functional calculator is allowed.

1. Solve any *three* of the following : 3×5=15

(*a*) Discuss polymerisation of CrO_4^{2-} anion.

(*b*) Explain 1 : 6 (octahedral heteroatom) polyanions with suitable example.

(*c*) Explain the following reactions of isopolyanions and heteropolyanions :

(*i*) Reaction with isocyanides

(*ii*) Reduction reaction.

(*d*) What are isolobal fragments ? Explain $Co(CO)_3$ and $Mn(CO)_4$ organometallic fragments are isolobal with CH fragment and p atom.

(*e*) Explain with suitable example, isolobal fragments upon polymerisation. Give isostructural molecules.

2. Answer any *three* of the following : 3×5=15

(*a*) What is the principle of polarography and explain its theory.

(*b*) Give the advantages and disadvantages of DME.

P.T.O.

(*c*) Derive an expression for Gibbs'-Duhem Margules equation for ideal solution.

(*d*) State and explain Raoult's law.

(*e*) A solution containing 2.44 gm of a solute dissolved in 75 g of water boiled at 100.413°C. Calculate the molar mass of the solute (K_b for water is 0.52 K kg mol^{-1})

3. Answer any *two* of the following : 2×5=10

(*a*) Explain total vapour pressure in terms of mole fraction.

(*b*) Explain free energy change of mixing for ideal solution.

(*c*) State and explain elevation in boiling point.

(*d*) Give the construction and working of DME.