

APRIL/MAY 2019

MCH12 — INORGANIC CHEMISTRY — I

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.



1. (a) Describe the structure of 12-phosphomolybdic acids.  
Or  
(b) Give two examples for the polyacids of vanadium, write their structures showing important features.
2. (a) Explain the characteristic features of the structure of  $[\text{Re}_2\text{Cl}_8]^{2-}$ .  
Or  
(b) Discuss Wade's rules of classification of structures of boranes.
3. (a) Discuss the polarographic method to determine stability constants.  
Or  
(b) Derive the relationship between step-wise and overall formation constant.



4. (a) Write short notes on 'cryptates'.

Or

- (b) Explain the structure of porphyrins.

5. (a) Write note on nephelauxetic effect.

Or

- (b) Explain the  $\text{MnO}_4^-$  is pink coloured whereas  $\text{ReO}_4^-$  is colourless.

SECTION B — ( $3 \times 15 = 45$  marks)

Answer any THREE questions.

6. Explain the structure, properties and applications of silicates.
7. Describe the structures and bonding of carboranes, metallocarboranes and trinuclear metal clusters with suitable examples.
8. (a) Illustrate class 'a', class 'b' and border-line metal ions based on the stabilities of their compounds. (5)
- (b) Describe the factors affecting stability of complexes. (10)

9. (a) Discuss how ORD and CD are helpful in assigning absolute configuration in complexes. (10)
- (b) Write notes on Schiff bases. (5)
10. (a) Discuss the energy level diagram of Tanabe-Sugano diagram. How does it differ from Orgel diagram? Give the Orgel diagram for  $\text{Ti}^{3+}$  in octahedral field. (10)
- (b) Compare charge transfer and d-d spectra. (5)

