

**2019**

Time : 3 hours

Full Marks : 75

Pass Marks : 34

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer five questions, selecting at least one from each Group, in which Q. No.1 is compulsory.

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

- (a)  $PbCl_2$  is stable but  $PCl_4$  is unstable.
- (b) Differentiate between double salt and complex salt.
- (c) Oxygen is paramagnetic.
- (d) Free energy is extensive property while chemical potential is an intensive property.

(e) First law of thermodynamics is the law of conservation of energy.

**Group - A**

2. (a) State and explain second law of thermodynamics. 10

(b) Deduce Gibbs-Helmholtz equation. 5

3. Explain the following : 5×3 = 15

- (a) Heat of Reaction
- (b) Heat of Formation
- (c) Heat of Neutralization

4. Explain reduced phase rule equation and term involved. 10

(a) What is eutectic point? 5

5. Write notes on any three of the following : 5×3 = 15

- (a) Water system
- (b) Van't Hoff reaction Isotherm
- (c) Criteria of thermodynamics equilibrium and feasibility
- (d) Carnot's theorem

**Group - B**

6. Draw MO<sub>2</sub> diagram of O<sub>2</sub> and O<sub>2</sub><sup>+</sup>. Compare their bond order, bond energy and magnetic property.

15

7. Explain the chemistry of Mn or Ni with respect to the following :

15

- (a) Position in PT
- (b) Occurrence of extraction
- (c) Oxidation state
- (d) Analytical test

8. Discuss the preparation, properties and structure of the following :

7+8 = 15

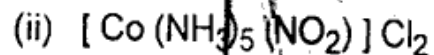
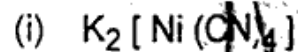
- (a) Thionic acids
- (b) Sodium thiosulphate

9. (a) Discuss the isomerism in complex compounds.

10

(b) Give the IUPAC name of the following :

2<sup>1</sup>/<sub>2</sub> × 2 = 5



10. Write notes on any **three** of the following :

5×3 = 15

- (a) Chromyl Chloride Test
- (b) Dipole Moment
- (c) Solubility Product and its Application
- (d) Setting of Cement

