

Roll No :

Total No. of Questions : 11]

[Total No. of Printed Pages : 3

SP-680

M.Sc. (Final) Examination, 2021

CHEMISTRY

Paper - IX (A)

(Group-C)

CH-507

(Recent Trends in Physical Chemistry)

Time : 1½ Hours]

[Maximum Marks : 75

Section-A

(Marks : 2 × 10 = 20)

Note :- Answer all *ten* questions (Answer limit 50 words). Each question carries 2 marks.

(खण्ड-अ)

(अंक : 2 × 10 = 20)

नोट :- सभी दस प्रश्नों के उत्तर दीजिए (उत्तर-सीमा 50 शब्द)। प्रत्येक प्रश्न 2 अंक का है।

Section-B

(Marks : 5 × 5 = 25)

Note :- Answer all *five* questions. Each question has internal choice (Answer limit 200 words). Each question carries 5 marks.

(खण्ड-ब)

(अंक : 5 × 5 = 25)

नोट :- सभी पाँच प्रश्नों के उत्तर दीजिए। प्रत्येक प्रश्न में विकल्प का चयन कीजिए (उत्तर-सीमा 200 शब्द)। प्रत्येक प्रश्न 5 अंक का है।

Section-C

(Marks : 10 × 3 = 30)

Note :- Answer any *three* questions out of five. (Answer limit 500 words). Each question carries 10 marks.

(खण्ड-स)

(अंक : 10 × 3 = 30)

नोट :- पाँच में से किन्हीं तीन प्रश्नों के उत्तर दीजिए। (उत्तर-सीमा 500 शब्द)। प्रत्येक प्रश्न 10 अंक का है।

BI-321

(1)

SP-680 P.T.O.

Section–A

2 each

1. Attempt all questions. Answers should not exceed **50** words in each question.
 - (i) Define the Huckel Molecular Orbital (HMO).
 - (ii) What is solvents isotopic effect ? Explain with example.
 - (iii) Define the enthalpy and Gibbs' free energy with example.
 - (iv) What is LTD model ?
 - (v) What is steric LFER ?
 - (vi) Define the Nucleofugacity with example.
 - (vii) What is Bronsted catalysis ?
 - (viii) What is dipole moments ?
 - (ix) What is Cluster expansion ?
 - (x) Define the Monte-Carlo methods.

Section–B

5 each

2. Write short notes on the following :
 - (i) MO energy levels
 - (ii) Curve-crossing model

Or

What is Marcus theory ? Explain with example.

3. Write short notes on the following :
 - (i) Arrhenius equation
 - (ii) Inductive substitution constant

Or

Explain the solvents effects from the curve crossing model.

4. Write short notes on the following :
 - (i) Nucleophilic and Electrophilic catalysis
 - (ii) Hydrogen bond

Or

Explain glass transition in super cooled liquids.

5. Write short notes on the following :
- (i) Critical constants
 - (ii) IBG and HNC equation

Or

Explain additivity of pair potential approximation.

6. Explain catalysis by non-covalent binding.

Or

Discuss Cohen-Trunbull free volume model.

Section–C

10 each

7. What is isotopic effect ? Explain primary and secondary kinetic effects.
8. Explain the various empirical index of solvation and use of solvation scales.
9. Write short notes on the following :
- (i) Hydrophobic effects electrostatic induction
 - (ii) Dispersion and resonance energy
10. Discuss the X-ray scattering spectroscopy techniques for structure studies of liquid ceramics.
11. Write short notes on the following :
- (i) Configurational entropy model
 - (ii) Macedoliovitz hybrid model