

SP-2254

M.Sc. (Final) Examination, 2019

CHEMISTRY

Paper-IX-A (Group-C)

CH-507

(Recent Trends in Physical Chemistry)

Time allowed : Three hours

Maximum Marks : 75

SECTION – A

(Marks 2 × 10 = 20)

Answer all ten questions (Answer limit 50 words). Each question carries 02 marks.

खण्ड – अ

(अंक 2 × 10 = 20)

समस्त दस प्रश्नों के उत्तर दीजिए (उत्तर सीमा 50 शब्द)। प्रत्येक प्रश्न 2 अंक का है।

SECTION – B

(Marks 5 × 5 = 25)

Answer all five questions. Each question has internal choice (Answer limit 200 words). Each question carries 05 marks.

खण्ड – ब

(अंक 5 × 5 = 25)

समस्त पाँच प्रश्नों के उत्तर दीजिए। प्रत्येक प्रश्न में विकल्प का चयन करें (उत्तर सीमा 200 शब्द)। प्रत्येक प्रश्न 05 अंक का है।

SECTION – C

(Marks 10 × 3 = 30)

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

खण्ड – स

(अंक 10 × 3 = 30)

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

SECTION – A

(Marks 2 × 10 = 20)

Attempt all questions. Answer should not exceed 50 words in each question.

1. (i) What are density functional methods ?
- (ii) What is solvent isotope effect ? Give an example.
- (iii) What is symmetry imposed barrier ?
- (iv) State bronsted catalysis.
- (v) What is LJD model ?
- (vi) What do you mean by regioselectivity in radical reactions ?

- (vii) State significance of internal pressure in liquids.
- (viii) What are critical constants ?
- (ix) What is cluster expansion ?
- (x) What do you mean by pair distribution function ?

(Marks $5 \times 5 = 25$)

SECTION – B

Attempt **all** questions. Answer should not exceed **200** words in each question.

2. Write a short note on enthalpy-entropy compensation in reference to I.F.F.R.

OR

What is reaction constant ? Derive Hammett equation in terms of rate constant instead of equilibrium constant.

1+4

3. Explain how various spectroscopic methods are useful in detection of individual conformers.

OR

- (i) What is electrophilic catalysis ?
- (ii) Explain catalysis by non-covalent binding.

1+4

4. Describe molecular receptors and design principles.

OR

Explain supramolecular reactivity and catalysis with suitable example.

5. Explain different potential functions for liquids.

OR

Explain additivity of pair potential approximation.

6. Explain glass transition in super cooled liquids.

OR

What is radial distribution functions from integral solution ?

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SECTION – C

(Marks 10 × 3 = 30)

Attempt any **three** questions out of **five**. Answer should not exceed **500** words in each question.

7. What is isotopic effect ? Explain primary and secondary kinetic isotopic effects. **2+4+4**
 8. Explain rotation around partial double bonds using Curtin-Hammett principle.
 9. Write an explanatory note on correlation between the significant liquid structure and the cell theory.
 10. Explain how can you use neutron and X-ray scattering spectroscopic techniques for structural studies of liquid ceramics.
 11. (i) Write short notes on equation of state in terms of RDF (Radial Distribution Function) for monoatomic fluids.
(ii) Explain IBG equation. **5+5**
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