

6214

M.Sc. (CHEMISTRY) 1st SEMESTER EXAMINATION, 2019

Paper – IV

GROUP THEORY AND SPECTROSCOPY

Time: Three Hours

Maximum Marks: 80

PART – A (खण्ड – अ)

[Marks: 20]

Answer all questions (50 words each).

All questions carry equal marks.

सभी प्रश्न अनिवार्य हैं। प्रत्येक प्रश्न का उत्तर 50 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – B (खण्ड – ब)

[Marks: 40]

Answer five questions (250 words each).

Selecting one from each unit. All questions carry equal marks.

प्रत्येक इकाई से एक-एक प्रश्न चुनते हुए, कुल पाँच प्रश्न कीजिए।

प्रत्येक प्रश्न का उत्तर 250 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – C (खण्ड – स)

[Marks: 20]

Answer any two questions (300 words each).

All questions carry equal marks.

कोई दो प्रश्न कीजिए। प्रत्येक प्रश्न का उत्तर 300 शब्दों से अधिक न हो।

सभी प्रश्नों के अंक समान हैं।

PART – A

- Q.1 (i) What is centre of symmetry?
(ii) What is the point group of the following molecules?
(i) CH₄ (ii) H₂O
(iii) Rigid Rotator.
(iv) Electromagnetic radiations.
(v) Force constant.
(vi) Overtone.
(vii) Emission Spectra.
(viii) What is the basic principle of XPS?
(ix) Lamb – Mossbauer Factor.
(x) Mossbauer nuclides.

PART – B

UNIT –I

- Q.2 Explain the character of a group?
Q.3 Construction of character table for C_{3v} point group.

UNIT –II

- Q.4 Explain effect of isotopic substitution on the transition frequencies.
Q.5 Explain Stark Effect.

UNIT –III

- Q.6 Explain Fingerprint Region.
Q.7 What is Rotational vibrational Raman Spectra.

UNIT –IV

- Q.8 What is Franck – Condon principle? Discuss.
Q.9 Explain Photo electric effect.

UNIT – V

Q.10 Explain Quadrupole interaction in Mossbauer spectroscopy.

Q.11 What is isomer shift in Mossbauer spectroscopy.

PART – C

Q.12 State the Great Orthogonality theorem and discuss its importance.

Q.13 Nuclear and Electron spin interaction.

Q.14 Factor influencing vibrational frequencies.

Q.15 Charge transfer spectra.

Q.16 Write application of Mossbauer spectroscopy.
