CR-2484

M. Sc. (First Semester) Examination,

Nov.-Dec. 2018

CHEMISTRY

Paper : Fourth

(Group Theory & Spectroscopy-I)

Time Allowed : Three hours

Maximum Marks : 40

Note : Attempt questions of all two sections as

Section-A

(Short Answer Type Questions) 5x3=15

Note : Attempt all the five questions. Each question carries 3 marks

1. Discuss the congugacy relation and classes.

Or

What is the importance of character table in symmetry of point groups? Write character table for C_2 V point group.

2. Which of the following molecules will give pure relational

spectra in microwave or far infrared region :

(a) CH_3F

(b) CH_2F_2

(C) SF_4

(d) SF_5Br

(e) C_6H_6

(f) C_2H_6 -staggered form

Or

Discuss the concept of rigid rotor and non-rigid rotor in microwave spectroscopy.

3. What do you understand by normal coordinate analysis?

Or

Write a short note on breakdown of Bonn-Oppenheimer approximation.

4. Write a short note on quantum theory of Raman Effect.

Or

Discuss mutual exclusion principle.

5. Discuss the charge transfer spectra.

Or

Write a note on electronic spectra of polyatomic molecule.

Section-'B'

(Long Answer Type Questions) 5x5=25

Note : Attempt all the five questions. Each question carries 5 marks.

6. Write a detailed note on group, subgroup and classes.

Or

What do you understand the great orthogonality theorem?

7. Discuss the effect of nuclear interactions on microwave spectroscopy. Discuss the effect of external field also.

Or

Effect of isotopic substitution on microwave spectrum and its significance?

8. Discuss Rotational Vibrational Spectroscopy and emer gence of POR branches in the vibrational spectra.

Or

Discuss Morse potential energy diagram and the dissociation of molecule with morse potential energy Diagram

9. Discuss Resonance Raman spectroscopy.

Or

Discuss in detail coherent Raman spectroscopy.

10. Write a detailed account of Koopman's theorem.

Or

Discuss Frank-Condon principle with the help of potential energy diagram.