

CODE: **196324**  
NOVEMBER 2020

TIME: 3 Hrs  
MAX. MARKS: 50

**PART A**

(10 x 2=20)

Answer any **TEN** questions.

1. What is Doppler broadening?
2. Write the regions of electromagnetic spectra?
3. Write the selection rules of rotational spectra?
4. What are called rotational transitions?
5. What is Rayleigh scattering.?
6. What are called fingerprint region?
7. List out the selection rules for electronic spectra?
8. What is Woodward rule?
9. What is called population inversion?
10. Give an example for dye lasers?
11. What are steric effects?
12. Give the mathematical equation of Heisenberg uncertainty principle?

**PART B**

(2 x 5=10)

Answer any **TWO** questions.

13. Discuss the rotational, vibrational and electronic energy levels and transitions in molecules?
14. Explain the Einstein absorption coefficient and Boltzmann distribution curves?
15. Explain in diatomic molecules as rigid rotors?
16. Explain the Born-Oppenheimer approximation?
17. Discuss the symmetric top and spherical top molecules?
18. Discuss the applications of IR and Raman spectroscopy?
19. Explain in detail about the Frank-Condon principle?
20. Explain the principle and techniques of PES?

**PART C**

(2 x 10=20)

Answer any **TWO** questions.

21. Explain how to enhance the spectral lines using Fourier transform?
22. Discuss the rotational spectra of linear and symmetric top polyatomic molecules?
23. Discuss the types of electronic transitions
24. Explain the symmetry and fundamental modes of vibration?
25. Discuss the followings: a) solid state Lasers      b) X-ray PES