

M.Sc. (Physics) (CBCS Pattern) Semester-III
PSCPHYT12-1 - Paper-XII (Foundation Course F 1.1) - Fundamentals of Spectroscopy

P. Pages : 1

Time : Three Hours



GUG/S/25/11304

Max. Marks : 80

Either :

1. a) What are the features of vector atom model? Discuss the Stern-Gerlack experiment. 8
b) Explain normal and anomalous Zeeman effect. 8

OR

- e) Explain the Stark effect in one electron system. 8
f) Explain Spin-orbit interaction and fine structure in sodium atom. 8

Either :

2. a) Discuss the rotational spectra of rigid diatomic molecule. 8
b) Explain Vibrating diatomic molecule as an harmonic oscillator. 8

OR

- e) Explain Fourier transform IR spectroscopy. 8
f) Discuss the rotational spectra of polyatomic molecules. 8

Either :

3. a) Discuss the Raman spectra of diatomic molecule. 8
b) Explain vibrational Raman spectra of diatomic molecule. 8

OR

- e) Explain pure rotational Raman spectra and discuss spectral transitions. 8
f) State Raman effect and explain observed characteristics of Raman spectrum. 8

Either :

4. a) Explain frank-Condon principle. 8
b) Discuss the rotational fine structure of electronic vibrational transitions. 8

OR

- e) Discuss the molecular electronic spectra in detail. 8
f) Explain the phenomena of Fluorescence and phosphorescence in brief. 8

5. Answer all of the following.
a) Explain LS and jj coupling schemes 4
b) Discuss IR technique. 4
c) Discuss the structural determination from Raman spectroscopy. 4
d) Explain dissociation energy of diatomic molecule. 4
