

M.Sc.(Physics) (CBCS Pattern) Sem-III
PSCPHYT11-3 - Core Elective E-1.3 - Atomic and Molecular Physics-I
(Paper-XI)

P. Pages : 1

Time : Three Hours



GUG/W/22/11300

Max. Marks : 80

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- Either:
1. a) Explain the concept of NMR spectroscopy. 8
b) Discuss the concepts of spin-spin and spin-lattice relaxation. 8
- OR**
- e) Explain Mossbauer emission of gamma rays. 8
f) Explain magnetic hyperfine interaction. 8
- Either:
2. a) Discuss Electron Spin Resonance (ESR) and its experimental setup. 8
b) Briefly explain LS & JJ coupling. 8
- OR**
- e) Discuss Paschen Back & Stark effect in details. 8
f) Explain construction and working of Ruby laser. 8
- Either:
3. a) Explain Rotational energy and frequency of diatomic molecules. 8
b) Discuss Intensity alteration in Raman spectra of diatomic molecules. 8
- OR**
- c) Discuss experimental setup for Raman spectroscopy in the structure determination of simple molecules. 8
d) Discuss Hund's rule. 8
- Either:
4. a) Explain Electronic spectra of diatomic molecules. 8
b) Discuss Born Oppenheimer approximation. 8
- OR**
- e) Discuss Frank-Condon principle. 8
f) Explain in details Rotational fine structure of electronic bands in detail. 8
5. Answer all the followings.
- a) Explain basic principles of interaction of spin and applied magnetic field. 4
b) Explain optical pumping. 4
c) Discuss Molecular polarizability. 4
d) Explain Hund's coupling cases. 4
