

- 2** Answer the following questions : (any two)
- (a) Discuss the magnetic moment due to orbital motion of an electron, Bohr-magneton and g-factor. 7
- (b) What is Stark Effect? Discuss its experimental arrangement with necessary figure. Mention the main features of this effect. 7
- (c) Discuss an example of Paschen-Back Effect in the principal series of Lithium. 7
- 3** Answer the following questions :
- (a) Discuss the fine structure of hydrogen atom spectrum. 7
- (b) Explain : How the orbital quantum number determines the shape of orbital. 7
- OR**
- (a) Discuss the non-rigid rotator in details. Depict the energy levels and spectra of rigid and non-rigid rotators. 7
- (b) Explain intensity of rotational lines in details. Transitions originating from the level having which J value will have the maximum intensity? 7
- 4** Answer the following questions : (any two)
- (a) Explain energy level correlation diagram for asymmetric rotor. 7
- (b) What is Morse curve? Draw and explain the Morse curve and the energy levels of a diatomic molecule. 7
- (c) Explain the working of IR spectrophotometer in detail. 7
- 5** Answer the following questions : (any two)
- (a) Write detailed note on the working of microwave spectrometer. 7
- (b) Write in detail on vibrating diatomic molecule. 7
- (c) Discuss symmetric stretching, symmetric bending and asymmetric Stretching in CO₂ molecule. 7
- (d) Discuss the first order Stark effect of a symmetric top molecule for J = 1, K = 1 → J = 2, K = 1 transition. 7