Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17PH2008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SPECTROSCOPY** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Discuss the different regions of electromagnetic spectra and the type of spectroscopy associated with different regions. | CO1 | 10 |
| b. | Give examples for wave, particle and dual nature of light. | CO1 | 5 |
| c. | Define absorption and emission. | CO1 | 5 |
| **(OR)** | | | | |
| 2. |  | Classify fine and hyperfine structure with examples. | CO2 | 20 |
|  |  |  |  |  |
| 3. | a. | Classify Raman and Rayleigh scattering. | CO3 | 5 |
| b. | With a neat diagram explain the quantum theory of Raman Scattering. | CO3 | 15 |
| **(OR)** | | | | |
| 4. |  | List out the advancements in LASER Raman Spectroscopy and explain the working of Raman Spectrophotometer with a neat sketch. | CO4 | 20 |
|  |  |  |  |  |
| 5. |  | With a neat sketch summarize the vibrational characteristics of the linear and non-linear molecules. | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Explain the diatomic spectra of a vibrating molecule with energy level diagrams. | CO4 | 20 |
|  |  |  |  |  |
| 7. |  | Describe the NMR spectrometer with emphasis on (i) single and double coil methods, and (ii) pulse method | CO5 | 20 |
| **(OR)** | | | | |
| 8. | a. | Comment on LASER and MASER. | CO5 | 3 |
| b. | Enumerate the working of MASER. | CO5 | 12 |
| c. | List the applications of MASER. | CO5 | 5 |
|  | | **Compulsory**: |  |  |
| 9. | a. | List out the applications of NMR, NQR and ESR. | CO6 | 6 |
| b. | Demonstrate the working of ESR spectrometer and mention its advantages and disadvantages. | CO6 | 14 |