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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **15PH3013** | **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. |  | Draw the C3v group table with suitable examples and explain the properties. | CO-1 | 20 |
| (OR) | | | | |
| 2. | a. | What is the difference between point group and space group? | CO-1 | 6 |
| b. | What is a basis?. Explain the reducible representations with suitable examples. | CO-1 | 14 |
| 3. | a. | What is meant by conjugate? | CO-1 | 5 |
|  | b. | Explain the different types of symmetry elements and symmetry operations with suitable examples and neat sketch. | CO-1 | 15 |
| (OR) | | | | |
| 4. |  | Draw the C2v group table with H2O molecule as an example and explain the properties. | CO-1 | 20 |
| 5. | a. | Write a note on population of energy levels. | CO-2 | 3 |
|  | b. | What is Larmor Precession? | CO-2 | 3 |
|  | c. | Derive the frequency of Larmor Precession. | CO-2 | 14 |
| (OR) | | | | |
| 6. |  | How does the diamagnetic shielding result in the chemical shift?  Discuss in detail in case of NMR. | CO-2 | 20 |
| 7. | a. | Define relaxation time. | CO-2 | 2 |
|  | b. | Discuss the different types of Relaxation times associated with NMR. | CO-2 | 8 |
|  | c. | Write a note on Fourier Transform Spectroscopy in N.M.R. | CO-2 | 10 |
| (OR) | | | | |
| 8. | a. | What is the significance of the Lande g-factor (g = 2), in case of electron spin? | CO-3 | 3 |
|  | b. | What is Bohr Magneton? | CO-3 | 3 |
|  | c. | Describe the interaction between electron spin and the external applied magnetic field. | CO-3 | 14 |
|  | | **Compulsory:** |  |  |
| 9. | a. | What is the working principle behind Mossabauer Spectroscopy? | CO-4 | 10 |
|  | b. | Explain any one application of Mossabauer Spectroscopy in detail. | CO-4 | 10 |

ALL THE BEST