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



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

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| **Code :** | **14CH3024** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ANALYTICAL CHEMISTRY** | **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. | Explain the theory, instrumentation and principle of thin layer chromatography. | CO1 | 10 |
| b. | Illustrate the importance of ion-exchange of chromatography with a diagram. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Describe the operation principle of HPLC. How can it be used in chemical analysis? | CO2 | 10 |
| b. | Explain the working principle of gas chromatography with a diagram. | CO2 | 10 |
|  |  |  |  |  |
| 3. | a. | Explain the operating principle of infrared spectrophotometer. | CO2 | 10 |
| b. | Describe the theory of simple harmonic oscillator. | CO3 | 10 |
| **(OR)** | | | | |
| 4. | a. | Describe the factors influencing vibrational frequencies in infrared spectroscopy. | CO3 | 10 |
| b. | Explain the identification of functional groups with the help of IR spectra. | CO4 | 10 |
|  |  |  |  |  |
| 5. | a. | Describe the instrumentation of electronic spectra. | CO2 | 10 |
| b. | Describe the laws of absorption and absorption transitions. | CO2 | 10 |
| **(OR)** | | | | |
| 6. | a. | Explain the Woodward-Fieser rules for α, β-unsaturated carbonyl compounds and dienes. | CO2 | 10 |
| b. | Explain the following: (i) Chromophores; (ii) Auxochromes. | CO3 | 10 |
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| 7. | a. | Describe the instrumentation of nuclear magnetic resonance (NMR) spectroscopy with a neat diagram. | CO4 | 10 |
| b. | Explain spin-spin coupling. | CO5 | 10 |
| **(OR)** | | | | |
| 8. | a. | Describe an application of 1H NMR to determine the structure of a simple organic compound. | CO5 | 10 |
| b. | Write notes on two dimensional NMR (1H-1H COSY) spectroscopy. | CO4 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the theory of thermogravimetric analysis (TGA). | CO6 | 10 |
| b. | Describe the principle and instrumentation of X-ray diffraction (XRD) analysis. | CO6 | 10 |