Reg.bNo. \_\_\_\_\_\_\_\_\_\_\_\_



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

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| **Code :** | **14CH3004** | **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. | |  | | --- | | Describe the working principle, instrumentation and applications of Gas chromatography. | | CO1 | 10 |
|  | b. | |  | | --- | | Write a note on Ion Exchange chromatography. | | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | |  | | --- | | Discuss the working principle and applications of Thin layer chromatography and Column chromatography. | | CO1 | 10 |
| b. | |  | | --- | | Describe the working principle, instrumentation and applications of HPLC. | | CO1 | 10 |
|  | | | |
| 3. | a. | Describe the working principle, instrumentation of UV-Vis Spectroscopy. | CO2 | 10 |
| b. | Illustrate Chromophores and Auxochromes with suitable examples. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Describe the various electronic transitions involes in UV-Vis Spectroscopy. | CO2 | 10 |
|  | b. | Estimate the λmax for the following compounds using Woodward-Fieser Rules.  isoprene à®à¯à®à®¾à®© à®ªà® à®®à¯à®à®¿à®µà¯ | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | List out any five applications of UV spectroscopy. | CO3 | 10 |
| b. | Write a note on Finger print region and functional group region of IR spectrum. | CO3 | 10 |
| **(OR)** | | | | |
| 6. | a. | Illustrate the various types of molecular vibrations. Calculate the number of vibrational modes in water and carbon dioxide. | CO3 | 10 |
| b. | Unknown molecule with molecular formula C5H10O are given. Which of these five molecules is it most likely to be? Label the bands in the following IR spectrum.  [2-c5h10o](https://s11452.pcdn.co/wp-content/uploads/2016/11/2-c5h10O-e1480363620831.png) | CO3 | 10 |
|  |  |  |  |  |
| 7. | a. | What is Nuclear Magnetic Resonance? Discuss the basic principles of  1H NMR Spectroscopy. | CO4 | 10 |
| b. | Writa a note on spin-spin spilitting in 1H NMR. | CO4 | 10 |
| **(OR)** | | | | |
| 8. | a. | What is chemical shift? Discuss the factors affecting chemical shift with suitable examples. | CO4 | 10 |
| b. | Identify the compound from the given1H NMR spectra data. | CO4 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Write a note on coupling constant(J) in 1H NMR Spectroscopy. | CO5 | 10 |
| b. | Provide a structure of a compound having a molecular formula of **C5H10O2**that is consistent with the following spectra.Show your workand assign all relevant peaks in the IR and 1H NMR spectra. To confirm your choice, predict the splitting patternsfor the protons in your proposed structure and estimate and/or calculate their chemical shifts. | CO6 | 10 |