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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR  
(GIET UNIVERSITY)**



Ph.D. (First Semester) Examinations, December – 2024

**23SPPECY1021 – Instrumental Methods of Chemical Analysis  
(Chemistry)**

Time: 3 hrs

Maximum: 70 Marks

**The figures in the right hand margin indicate marks.**

**Answer ANY FIVE Questions.**

**(14 x 5 = 70 Marks)    Marks**

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|------|---|----|
| 1.   | Explain the working principle and instrumentation of IR Spectroscopy. Mention its advantages and disadvantages? | 14 |
| 2.   | Explain the analytical applications, advantages and disadvantages of NMR Spectroscopy                           | 14 |
| 3.   | Explain in detail the Mass Spectroscopy and structural determination of any organic compounds.                  | 14 |
| 4.   | Explain the working principle of AES and its analytical applications  | 14 |
| 5.   | Explain working, principle and instrumental part of SEM.  | 14 |
| 6.a. | Draw and explain Jablonski diagram for fluorescence and phosphorescence.  | 7  |
| b.   | Write the difference between AAS and AES  | 7  |
| 7.   | Mention the analytical applications, advantages and disadvantages of Differential scanning calorimetry.         | 14 |
| 8.a. | Explain the working principle of DTA.   | 7  |
| b.   | Explain the instrumentation of TGA  | 7  |

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