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Question Paper Code	12357
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**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023**

Fifth Semester

**Electronics and Instrumentation Engineering**

(Common to Instrumentation and Control Engineering

**20EIPC501 - ANALYTICAL INSTRUMENTATION**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. State Beer-Lambert law.  | 2,K1,CO1                      |
| 2. List 4 different techniques used for sampling of solids.       | 2,K2,CO1                      |
| 3. Define Distribution Constant.                                  | 2,K1,CO2                      |
| 4. Classify the various types of Chromatography.                  | 2,K2,CO2                      |
| 5. Define Conductivitymetry.                                      | 2,K1,CO3                      |
| 6. List the sources of error in oxygen analyzers.                 | 2,K2,CO3                      |
| 7. Differentiate between glass electrode and reference electrode. | 2,K2,CO4                      |
| 8. List the different types of Ion selective electrodes.          | 2,K2,CO4                      |
| 9. State the basic principle of NMR.                              | 2,K2,CO5                      |
| 10. Mention the various parts of the Mass spectrometer.           | 2,K2,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) Describe the working principle of (IR) Infra-red spectrophotometer and the various components involved in it. 13,K2,CO1
- OR**
- b) Explain the working principle of FTIR Spectrometer with neat diagram. 13,K2,CO1
12. a) Draw the schematic diagram of a gas chromatography & explain the components in detail. 13,K2,CO2
- OR**
- b) Draw & explain the instrumentation of HPLC in detail. 13,K2,CO2
13. a) Explain in detail the working principle of O<sub>2</sub> Analyzer based on magnetic susceptibility. 13,K2,CO3

**OR**

b) Suggest a method to estimate the amount of sulphur dioxide. *13,K2,CO3*

14. a) List the types of electrodes used for pH measurement and explain the principle of pH measurement. *13,K2,CO4*

**OR**

b) Explain the principle of conductivity measurement by using the conductivity meters in detail. *13,K2,CO4*

15. a) Explain the basic principle of NMR? Discuss the working principle of NMR spectrometer & give its applications. *13,K2,CO5*

**OR**

b) With neat Sketch explain the various components of Mass spectrometer. *13,K2,CO5*

**PART - C (1 × 15 = 15 Marks)**

16. a) (i) Explain the working of silica analyzer in detail. *8,K2,CO4*

(ii) Explain about the time of flight mass analyzer in detail. *7,K2,CO5*

**OR**

b) (i) Explain the working of sodium analyzer in detail. *8,K2,CO4*

(ii) Explain about the quadrupole mass analyzer in detail. *7,K2,CO5*