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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## February / March 2023 Semester End Main Examinations

**Programme: B.E.** **Semester: V**
**Branch: Electronics and Instrumentation Engineering** **Duration: 3 hrs.**
**Course Code: 19EI5PE2AL** **Max Marks: 100**
**Course: Analytical Instrumentation** **Date: 01.03.2023**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.



**UNIT - I**

| | | | | |
|---|---|---|---|---|
| 1 | a) | Derive the expression for Beers Lamberts law for total absorption | **10** |
| | b) | Discuss the principle about Micheslon interferometer | **05** |
| | c) | Explain any five properties of EM waves. | **05** |

**OR**

| | | | |
|---|---|---|---|
| 2 | a) | With neat schematic, explain the IR photometer gas analyzer. | **10** |
| | b) | Explain single beam and double beam spectrometer with neat diagram. | **10** |

**UNIT - II**

| | | | |
|---|---|---|---|
| 3 | a) | Discuss direct current plasma with neat sketch. | **10** |
| | b) | Discuss the background correction method based on Zeeman Effect. | **05** |
| | c) | Discuss electro thermal vaporization techniques with neat sketch. | **05** |

**UNIT - III**

| | | | |
|---|---|---|---|
| 4 | a) | Analyze the working of energy dispersive X-ray fluorescence spectrometer with neat diagram. | **10** |
| | b) | Derive an expression for Nernst equation and List out any four Different types of electrode membrane shapes. | **10** |

**OR**

| | | | |
|---|---|---|---|
| 5 | a) | Explain the working of x ray tube with neat diagram | **10** |
| | b) | Discuss the working of x ray monochromator and detector with neat diagram | **10** |

## UNIT - IV

6 a) With respect to the mass a spectrometer assess the working of following: **12**

i. Batch inlet system
ii. Magnetic sector spectrometer
iii. Quadrupole mass analyzers

b) With near schematics analyze the working of double beam focusing mass spectrometer. **08**

## UNIT - V

7 a) Draw the schematic of gas chromatograph and explain the following: **12**

i. Carrier gas system
ii. Thermal conductivity detector

b) Discuss with neat diagram working of elution in column chromatography. **08**

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