

# CBCS SCHEME

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18EI/BM/ML46

## Fourth Semester B.E. Degree Examination, July/August 2022 Scientific and Analytical Instrumentation

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Distinguish between analytical techniques and analytical method. Write example for each. (05 Marks)
- b. List the principal types of chemical instrumentation with an example. (05 Marks)
- c. With a flow chart, explain the major steps in solving an analytical problem. (10 Marks)

OR

- 2 a. Discuss the different radiation sources used in IR spectrophotometers. (06 Marks)
- b. With a diagram, explain the Littrow mounting infrared monochromator. (06 Marks)
- c. Draw and explain the principle and working of Golay Pneumatic cell. (08 Marks)

### Module-2

- 3 a. Discuss the absorption filters and interference filters used in UV and visible spectrometry. (10 Marks)
- b. With a neat diagram, explain the construction and working of photo emissive tube. (10 Marks)

OR

- 4 a. Draw the schematic and explain the construction and working of photodiode. (10 Marks)
- b. With a schematic diagram discuss the working of single beam UV/visible spectrophotometer. (10 Marks)

### Module-3

- 5 a. With a diagram, explain the process at nebulization and flame atomization in flame spectrometric method. (10 Marks)
- b. With a neat diagram, explain flame emission spectrometer. (10 Marks)

OR

- 6 a. With a neat schematic diagram, explain the single beam atomic absorption spectrometry. (10 Marks)
- b. Discuss the various interferences associated with flames and furnaces. (10 Marks)

### Module-4

- 7 a. List the parts of a gas chromatograph and with a block diagram explain the working of gas chromatograph. (10 Marks)
- b. With a neat diagram, explain the Kathrometer cell. (10 Marks)

OR

- 8 a. List the different types of pumps used in HPLC. Explain with a diagram reciprocating piston pumps. (10 Marks)
- b. With a diagram, explain the principle and working of deflection type refractometer used in HPLC. (10 Marks)

**Module-5**

- 9 a. Define blood gas analyzer. Discuss the problems associated with blood pH measurement. (10 Marks)  
b. List the various gas pollutants. Explain the non-dispersive infrared analyser to measure carbon monoxide. (10 Marks)

**OR**

- 10 a. With a neat diagram, explain the measurement of nitric oxide using CO laser. (10 Marks)  
b. Write short note on water pollution monitoring instruments. (10 Marks)

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