Printed Pages: 01 **Sub Code: EIC033**

Paper Id: 131247 **Roll No.** | | | | | | | | | | |

B.TECH

(SEM VIII) THEORY EXAMINATION 2018-19

ANALYTICAL INSTRUMENTATION

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Explain the principle of Mass Spectrometers.

b. What are the basic elements of analytical instruments?

c. Draw the pictorial view of Inductively-coupled plasma spectrometer.

d. Explain the principle of flame photometers.

e. Write the sources of interference in Atomic Absorption Spectrometers.

f. State Beer Lambert's Law. Mention engineering applications of photometry

g. Mention various components of Mass spectrometers.

h. Explain the sensitivity enhancement for analytical NMR-Spectroscopy.

i. Mention the types of Infrared Spectrometers.

j. Write the expression for concentration and interference in flame photometry.

SECTION B

2. Attempt any *three* of the following: 10x3=30

a. What is Quadrupole mass filter? Explain its role in deducing the result of analysis in case of Quadrupole Mass Spectrometer

b. Discuss various Sampling handling techniques for matters used in analysis.

c. Briefly explain different types of NMR Spectrometers.

d. Explain in details the process of determinations.

e. What are the laws relating to absorption radiation?

SECTION C

3. Attempt any *one* part of the following: 10X1=10

a. Draw Electromagnetic Spectrum and show the relationship between Energy and Wavelength. Write a short note on microprocessor-based Spectrometer (block diagram).

b. Draw the schematic diagram of a double beam spectrophotometer and explain its principle of operation.

4. Attempt any *one* part of the following: 10X1=10

a. What are the different sources of infrared radiation employed in Infrared Spectrophotometers and the different methods in Infrared Spectrophotometers? Explain in detail.

b. Explain the working principle and function of Infrared Spectrometers. Describe the various components of Infrared Spectrometers.

5. Attempt any *one* part of the following: 10X1=10

a. Draw the block diagram of the electronic circuit of an atomic absorption spectrophotometer and explain the working of each block in detail.

b. Explain the operation and types of Flame photometer Also list its various applications.

6. Attempt any *one* part of the following: 10X1=10

a. Discuss Ion cyclotron resonance (ICR) mass spectrometer and trapped Ion analyzers.

b. Explain the working of Gas chromatograph. List the advantages and problems related to interfacing of liquid Gas Chromatograph with Mass Spectrometer.

7. Attempt any *one* part of the following: 10X1=10

a. Discuss principle of NMR with neat schematic diagram. Also state why RF source is necessary for NMR Spectroscopy.

b. What are the advantages of Fourier transform NMR spectroscopy?Write a short note on Varian T-60 NMR Spectroscopy.

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