M.TECH. (I.E.E.), Examination 2018
(1st Year, 2nd Semester)

Instrumental Analysis

Time: Three Hours **Full Marks: 100**

Answer any five questions

1. a) Explain the following terms in connection with gas chromatography:
   i) Chromatogram
   ii) Partition coefficient
   b) Draw and explain the different parts of a gas chromatography.

   4+16

2. a) Discuss the theory of Raman spectroscopy.
   b) Give a block diagram of Raman spectrometer and identify the components.
   c) Write a note on the application of Raman spectrometry.

   6+7+7

3. a) Discuss the working principle of voltammetric instrumentation.
   b) Define the following terms:
   i) Fourier transform voltammetry
   ii) Square-wave voltammetry

   12+8

4. a) Explain the different types of molecular vibrations in IR Spectroscopy.
   b) List the applications of IR spectrometry.

   14+6

5. Explain the followings:
   a) Theory of NMR
   b) Applications of photoluminescence methods

   10+10

6. a) Explain the basic principles involved in potentiometry.
   b) With suitable diagram explain pH measurements using a glass electrode.

   8+12

7. Write short notes on any two of the followings: 2x10
   a) HPLC
   b) UV-vis spectrophotometer
   c) Thermal conductivity detectors
   d) Working electrodes for voltammetry