B.E. INSTRUMENTATION ENGINEERING EIGHTH SEMESTER

# IN801 - ANALYTICAL INSTRUMENTATION AND POLLUTION CONTROL

P. Pages : 2 **GUG/W/18/2060**

Time : Three Hours * 1 5 7 6 * Max. Marks : 80

---

Notes : 1. Same Answer book must be used for each section.
2. All questions carry marks as indicated.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

**1.** a) Discuss the advantages and disadvantages of instrumental and classical methods of analysis. **8**

b) With neat diagram, write short note on :- **8**
1) Prism and grating. 2) Monochromators.

**OR**

**2.** a) Define Beer-Lambert law and write the apparent deviations from Beer's low. **7**

b) Distinguish between spectral, Electro analytical and separative methods of Analysis. **9**

**3.** a) With a neat instrumentation setup, examine the principle of IR spectrophotometer and label the various components involved in it. **10**

b) With neat diagram, describe the principle and working of X-ray spectroscopy. **6**

**OR**

**4.** a) Define transmittance and absorbance? How colorimeter is used to measure it? **6**

b) With necessary diagram. Describe the principle, construction and working of UV spectrophotometer. **10**

**5.** a) Deduce the operation of Atomic absorption spectrometer in detail. Mention the sources and detectors used in AAS. **10**

b) What is emission spectra? Elaborate different types of spectra. **6**

**OR**

**6.** a) With the help of neat diagram, describe the principle of operation and construction details of flame photometry. **10**

b) Outline the advantages, disadvantages and application of Atomic absorption spectroscopy. **6**

**7.** a) Classify the various chromatographic methods? Define retention time and partition ratio in chromatograph? **8**

b) Draw the instrumentation diagram for column chromatography and discuss how separation process will be performed in column chromatography. **8**

**OR**

**8.** a) Describe the strategy to separate sample in HPLC with a neat instrumentation diagram. **8**

b) Enlist various detectors used in gas chromatograph and explain any two in detail. **8**

**9.** a) With a schematic diagram explain the method of measuring Sulphur dioxide $(SO_2)$ estimation using conductivity method. **8**

b) With neat diagram explain the working principle of thermal conductivity analysis. **8**

**OR**

**10.** a) Discuss how to estimate the amount of hydrocarbons present in air with neat instrumentation set up. **8**

b) What are the various methods for $NO_x$ measurement? How $NO_x$ is measured using Co laser? **8**

**********