

S.E. (Instru) sem IV choice based 10/12/18 (1/1)

[Time: Three Hours]

[Marks:80]

- N.B:
1. Question.No.1 is compulsory.
  2. Attempt any three questions from remaining five questions.
  3. Assume suitable data wherever necessary.
  4. Figures to the right indicate full marks.

- 1 Answer the following 20
  - a State Beer- Lambert's Law and explain the causes for deviation from Beer's law.
  - b Determine resonance frequency of proton in  $H_0=23,000$  G,  $I=\pm 1/2$ ,  $\mu=2.797$ , and  $h=6.626 \times 10^{-34}$  J sec.
  - c Explain in brief the principle of operation of mass spectrometry.
  - d Explain Time decay of radioactive isotopes.
  - e Calculate the energy of i)  $5.3 \text{ \AA}$  photon, ii)  $530 \text{ nm}$  photon of visible radiation.
- 2
  - a Explain the working of a double beam UV spectrometer with neat diagram. 10
  - b With neat diagram, explain Raman effect. Draw and explain the construction of Raman spectrometer. 10
- 3
  - a Draw and explain the working of Atomic Absorption spectrometer. 10
  - b With a neat diagram, explain the working of Gas chromatograph. Also state its applications. 10
- 4
  - a Explain the concept of Fluorescence and Phosphorescence. Also explain the working of single beam filter fluorimeter with neat diagram. 10
  - b Explain the working of Photomultiplier tube. 10
- 5
  - a Explain with a neat diagram, the working of Ionization Chamber. 10
  - b Explain Paramagnetic Oxygen analyzer with a neat diagram. 10
- 6 Write short notes on (any two) 20
  - a Gas density analyzer
  - b Flame ionization detector
  - c Monochromators