S.E.(Instrumentation Engineering)(SEM-IV)(Choice Based) / DEC.2019/13.12.2019

[Time: 3 Hours] **[Total 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 **(Any 4)** **[20]**
- a) Explain Time decay of radioactive isotopes.
- b) Explain with a neat diagram, the working of Ionization Chamber.
- c) Explain in brief the principle of operation of mass spectrometry.
- d) Explain with a neat diagram, the working of Scintillation Counter.
- e) Write short note on Plasma Excitation sources.

2 a) State and prove Beer- Lambert's Law. **[10]**

b) With neat diagram, explain Raman effect. Draw and explain the construction of Raman spectrometer. **[10]**

3 a) With a neat diagram, 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) When does Nuclear Magnetic Resonance occur? Explain the working of NMR spectrometer. **[10]**

b) With neat diagram, explain double beam spectrophotometer. **[10]**

5 a) Explain the concept of Fluorescence and Phosphorescence. Also explain the working of single beam filter fluorimeter with neat diagram. **[10]**

b) Explain CO2 analyzer with neat diagram. **[10]**

6 Write short notes on **(Any two)** **[20]**
- a) Gas density analyzer
- b) Photomultiplier tube
- c) Flame Ionization detector

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