

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
EIGHTH SEMESTER B. TECH DEGREE EXAMINATION (S), OCTOBER 2019

**Course Code: AE402**

**Course Name: ANALYTICAL INSTRUMENTATION**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) With a block diagram explain PC based analytical instrumentation system. (5)
- b) Write a note on Electromagnetic spectrum. (5)
- c) Why must the slit width of a prism monochromator be varied to provide constant effective bandwidths where as a nearly constant slit width may be used with a grating monochromator? (5)
- 2 a) What are black body sources? Give examples. (5)
- b) With suitable diagram explain the construction and working of Atomic Absorption Spectrometry. (8)
- c) Indicate the regions of Infrared spectrum. (2)
- 3 a) With a block diagram explain the operation of a Flame photometer. List the advantages of flame photometry. (10)
- b) What is the principle of Colorimetry? (5)

**PART B**

*Answer any two full questions, each carries 15 marks.*

- 4 a) Explain the optical system of a typical Spectro-fluorimeter. (4)
- b) Which spectrometer incorporates the kinetic energy of the ion? Explain in detail with neat sketch. (8)
- c) Draw the process diagram for light absorption to acoustic waves. (3)
- 5 a) Illustrate the instrumentation of Photo thermal spectroscopy and list different photothermal processes. (6)
- b) Explain the following: (9)
  - (a) Raman Effect.
  - (b) Applications of Mass Spectrometry.
  - (c) Applications of Fluorimeter

- 6 a) Explain the working of an X-ray diffractometer. (8)  
b) Explain the principle of electron spectroscopy. (7)

**PART C**

*Answer any two full questions, each carries 20 marks.*

- 7 a) Discuss about any five terms used in chromatography. (5)  
b) Explain the basic principle of Gas chromatography and write the details of its operation with neat sketches. (10)  
c) What are the different sample injection systems used in Liquid Chromatography? (5)
- 8 a) Explain in detail, the construction and working principle of HPLC with a neat diagram. (10)  
b) Explain the analysis techniques adopted to measure carbon monoxide content in an air sample. (10)
- 9 a) With necessary explanations, justify the role of gas analysers in monitoring pollution. (10)  
b) With the help of suitable sketches, explain the principle of operation and measurement techniques employed in thin film gas sensors. List out the applications. (10)

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