

G 1331

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Reg. No.....

Name.....

**B.TECH. DEGREE EXAMINATION, MAY 2016**

**Seventh Semester**

Branch : Applied Electronics and Instrumentation, Electronics and Instrumentation,  
Instrumentation and Control Engineering

AI 010 704, EI 010 704, IC 010 704—ANALYTICAL INSTRUMENTATION (AI, EI, IC)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

Time : Three Hours

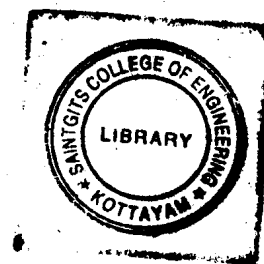
Maximum : 100 Marks

**Part A**

*Answer all questions.*

*Each question carries 3 marks.*

1. What are the elements of a PC based analytical instrument ?
2. What is the principle of fluorescence ? Explain.
3. What is inductively coupled plasma ?
4. Give a brief description of a typical flue gas analyser.
5. Write the advantages of HPLC over other chromatographic techniques.



(5 × 3 = 15 marks)

**Part B**

*Answer all questions.*

*Each question carries 5 marks.*

6. Explain the various detectors used in IR spectroscopy.
7. Describe the constructional details of a photoacoustic spectrometer.
8. Explain the properties of X-rays that are useful in analysing chemicals.
9. Explain the analysing technique adopted to measure carbonmonoxide content in an air sample.
10. Explain the injection systems for samples used in gas and liquid chromatography.

(5 × 5 = 25 marks)

**Part C**

*Answer all questions.*

*Each full question carries 12 marks.*

11. With neat diagrams, explain the working principle of single beam and double beam spectrophotometers.

Or

Turn over

12. Give a detailed account on UV-visible spectroscopy, giving its industrial applications.
13. With neat diagrams, explain the principle of working and applications of (i) Spectro fluorimeter and (ii) Ratio fluorimeter.

Or

14. Explain the theory behind (i) atomic absorption spectrophotometer and (ii) Photothermal spectroscopy.
15. Explain the theory and instrumentation of NMR spectroscopy. With respect to the same describe Larmor frequency, nuclear spin and chemical shift.

Or

16. With respect to X-ray spectroscopy, what is Auger emission spectroscopy? Explain the methods of producing X-rays and detectors used.
17. Describe the principle of working of any *three* types of thermal sensors used in industry.

Or

18. Explain the working of principle of (i) pH meter and (ii) dissolved oxygen meter.
19. Explain (i) rate theory and plate theory with respect to chromatography; (ii) mobile phase delivery systems in HPLC; and (iii) eddy diffusion and its effects in band broadcasting in chromatographic columns.

Or

20. Discuss the principle, constructional details and applications of Gas chromatography with necessary diagrams.

(5 × 12 = 60 marks)

