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**Question Paper Code : 40989**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Electrical and Electronics Engineering

OBT751 — ANALYTICAL METHODS AND INSTRUMENTATION

(Common to : Biomedical Engineering/ Electronics and Instrumentation  
Engineering/ Instrumentation and control Engineering/ Medical Electronics)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

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PART A — (10 × 2 = 20 marks)

1. Define Wave length and wave number?
2. List out the sources of UV and visible light radiations.
3. Define Quenching. List out the types of quenching.
4. Draw a neat labeled diagram of IR Spectrophotometer.
5. Write a note on the solvents used in NMR.
6. Define Chemical shift.
7. What are Guard columns?
8. List out the important applications of Size exclusion chromatography.
9. Write a short note on reference electrodes used in Potentiometry.
10. List out the important applications of Voltametry.

PART B — (5 × 13 = 65 marks)

11. (a) Write a note on the following components used in Spectrometry in detail
- (i) Wavelength Selectors (7)
  - (ii) Radiation transducers (6)

Or

- (b) Write a detailed note on the sources of noise and the process of enhancement of signal to noise. (13)
12. (a) (i) Write a detailed note on the theory of Fluorescence. (8)
- (ii) List out the important applications of Fluorimetry. (5)

Or

- (b) State and derive Beer-Lambert's law. List out its deviations and limitations. (8+5)
13. (a) Write a detailed note on the theory involved in NMR Spectroscopy. Add a note on the reference standard used in NMR Spectroscopy. (10+3)

Or

- (b) Write a note on the following
- (i) Types of ions produced in Mass Spectroscopy (9)
  - (ii) Electron paramagnetic resonance (4)
14. (a) With a neat labeled diagram explain the steps involved in the process of Ion exchange chromatography. (13)

Or

- (b) With a neat labeled diagram explain the steps involved in the process of Capillary electrophoresis. (13)
15. (a) (i) Brief a note on Ion selective and molecular selective electrodes. (9)
- (ii) Add a note on the important applications of Potentiometry. (4)

Or

- (b) Summarize in detail the techniques involved in the study of surfaces. Add a note on its importance. (10+3)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Summarize in detail the ionization techniques involved in Mass Spectroscopy. (10)

(ii) List out the important applications of Mass Spectroscopy. (5)

Or

(b) Explain the following in detail:

(i) Detectors of HPLC. (8)

(ii) Pumps used in HPLC. (7)

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