



17539

15116

3 Hours / 100 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions :** (1) *All questions are compulsory.*
(2) *Answer **each** next main question on a **new** page.*
(3) *Illustrate your answers with neat sketches **wherever** necessary.*
(4) *Figures to the **right** indicate **full** marks.*
(5) *Assume suitable data, if **necessary**.*
(6) *Mobile Phone, Pager and any other Electronic Communication devices are **not** permissible in Examination Hall.*

Marks

1. A) Attempt **any three** :

12

- What is electrophoresis ? Explain in brief paper electrophoresis.
- What is nuclear spin ? Explain the resonance condition in NMR spectrometer.
- Draw neat labelled block diagram of complete blood gas analyzer.
- List measurement techniques for gas pollutants. Give concentration level of different gas pollutants.

B) Attempt **any one** :

6

- Draw a neat labelled block diagram analytical instrument system. Explain the function of each block in brief.
- State the principle of chromatography. List out basic elements of gas chromatography and state function of carrier gas in gas chromatography.

2. Attempt **any four** :

16

- Describe the operation of single beam filter photometer.
- Describe liquid chromatography with the help of labelled diagram.
- Describe the measurement of ozone. Using conductivitymeter.
- Describe principle of operation of mass spectrometer with neat diagram.
- Describe the method for SO₂ measurement using conductivity method.
- Draw block diagram of infrared gas analyzer and describe function of each block.

P.T.O.

**3. Attempt any four :****16**

- State Beer Lambert's law and list four instruments based on Beer Lambert's law.
- With neat diagram give constructional details of NMR spectrometer.
- Give the principle of pH meter and draw a neat labelled diagram of glass electrode for pH measurement.
- Give the detail classification of chromatography.
- Describe the nitrogen oxides measurement using CO laser.

4. A) Attempt any three :**12**

- Explain the working null detector type pH meter.
- Draw block diagram of thermal conductivity analyzer using thermister and briefly describe function of each block.
- What is catheter tip electrode ? Explain how PO_2 is measured using it.
- Draw a neat diagram of magnetic deflection mass spectrometer. State its principle.

B) Attempt any one :**6**

- Define chemiluminescence. How nitrogen oxides measurement is done using chemiluminescence ?
- Draw a neat labelled diagram of flame photometer and explain the role of each block.

5. Attempt any four :**16**

- List any four applications of flame photometer.
- Describe the operation of double beam densitometer with proper diagram.
- Describe the method for carbon dioxide measurement using Gas Chromatography.
- Define pH. State use of buffer solution.
- What is conductivity measurement in conductivity meter ?
- What are the different phases in chromatography, briefly describe mobile phase ?

6. Attempt any four :**16**

- Draw optical diagram of spectrophotometer using grating. State the role of grating in it.
 - What is calomel electrode ? Draw its labelled diagram and state its use.
 - What is chemical shift ? List any two applications of NMR.
 - What is GCMS and LCMS ? State two applications of each.
 - Compare liquid chromatography with Gas Chromatography.
-