

22543

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.

Marks

1. Attempt any FIVE of the following :

10

- (a) Write technique used in Analytical Instrument transducer for the following properties of analyst.
 - (i) Radiation absorption
 - (ii) Temperature change
- (b) List any two Separation method used in Analytical Instrumentation.
- (c) List any two applications of NMR Spectrometer.
- (d) Explain interaction of radiation with matter.
- (e) List two applications each of
 - (i) GCMS
 - (ii) LCMS
- (f) List gases that are used as carrier gas for gas chromatography.
- (g) List the types and concentration of any two gas pollutants.

2. Attempt any THREE of the following :

12

- (a) Draw block diagram of Analytical Instrument. Explain its each block.
- (b) Explain the working principle of Paramagnetic Oxygen Analyser.
- (c) Compare gas chromatography and liquid chromatography (any 4 points).
- (d) Explain measurement of ozone using conductivity meter.



- 3. Attempt any THREE of the following : 12**
- (a) State and explain Beer Lambert law. Give its mathematical expressions.
 - (b) Draw a neat block diagram of liquid chromatography. State the role of high pressure pump in it.
 - (c) Describe working principle of Infrared Gas Analyser with neat diagram.
 - (d) Describe working principle of conductivity method for monitoring SO_2 present in environment.
- 4. Attempt any THREE of the following : 12**
- (a) Draw a schematic diagram of multichannel photometer, explain it in brief.
 - (b) Describe with neat diagram time of flight mass spectrometer.
 - (c) Explain working principle of Thermal Conductivity Analyser using thermistor.
 - (d) Define chemiluminescence. Explain measurement of nitrogen oxide using chemiluminescence.
 - (e) Describe CO laser method for monitoring of nitrogen oxides present in environment with a neat schematic Diagram.
- 5. Attempt any TWO of the following : 12**
- (a) Draw discharge type atomizer used in flame photometer. Explain it.
 - (b) Explain principle of operation of magnetic deflection type mass spectrometer with neat diagram.
 - (c) Explain construction and working of null detector type pH meter. List applications of pH meter.
- 6. Attempt any TWO of the following : 12**
- (a) Describe working of double beam filter photometer with neat diagram. Write any two applications of colorimetric method.
 - (b) Draw neat block diagram of Complete Blood Analyser for measurement of pH, pCO_2 and pO_2 . Explain it.
 - (c) Describe the working of gas chromatography for monitoring of carbon monoxide present in environment.
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