

22543

23242

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) State elements of Analytical Instrumentation System.
- (b) Write the use of grating in Analytical Instruments.
- (c) List any two applications of NMR Spectrometer.
- (d) State working principle of Flame Photometer.
- (e) State classification of Chromatography.
- (f) State application of Liquid Chromatography.
- (g) State the necessity of monitoring gas pollutants.

2. Attempt any THREE of the following :

12

- (a) State the use of optical filter and absorption filter in analytical instruments.
- (b) Describe working of calomel electrode with neat diagram.
- (c) Draw a labelled block diagram of LCMS. Give two applications of LCMS.
- (d) Describe working principle of CO laser for monitoring Nitrogen Oxide present in environment.



- 3. Attempt any THREE of the following : 12**
- (a) Explain working principle of Spectrophotometer using Prism technique with diagram.
 - (b) Draw a neat block diagram of gas chromatography and explain its working.
 - (c) Explain working principle of thermal conductivity analyzer with diagram.
 - (d) Describe the working principle of 'SO₂' measurement using conductivity method with diagram.
- 4. Attempt any THREE of the following : 12**
- (a) Describe working of double beam filter photometer with diagram.
 - (b) In chromatography, if the temperature of oven increases, what will be its effect on retention time in chromatogram ?
 - (c) State 2 applications of Infrared gas analyzer and draw neat diagram.
 - (d) State types and concentration of various gas pollutants.
 - (e) Describe working principle of ozone measurement using conductivity meter.
- 5. Attempt any TWO of the following : 12**
- (a) Explain the procedure to troubleshoot the flame photometer.
 - (b) Explain the principle of operation of time of flight type mass spectrometer with neat diagram.
 - (c) Draw block diagram of complete blood gas analyzer and explain it.
- 6. Attempt any TWO of the following : 12**
- (a) Differentiate spectrophotometer and flame photometer (4 points). Write 2 applications of calorimeter.
 - (b) State applications of thermal conductivity analyzer. State principle of pH meter.
 - (c) Convert volumetric concentration of gas to gravimetric concentration of gas.
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