

17539

11920

3 Hours / 100 Marks

Seat No.

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- 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

- (a) Draw block diagram of analytical instrumentation system. State function of each block.
- (b) Describe principle and working of time of flight mass spectrometer.
- (c) State principle and draw block diagram of thermal conductivity analyzer using thermistor.
- (d) List the types and concentration of various gas pollutants.

(B) Attempt any ONE :**6**

- (a) Describe the working of null detector type pH meter with a neat diagram.
- (b) State the principle of chromatography. Classify chromatography.

2. Attempt any FOUR :**16**

- (a) Draw diagram of flame photometer. Also, list its applications.
- (b) Describe liquid chromatography with a neat diagram.
- (c) Describe method of carbon monoxide measurement using gas chromatography.
- (d) Describe principle of operation of mass spectrometer.
- (e) Give general equation for representation of concentration of gases. State significance of each term.
- (f) Draw and describe working of catheter tip electrode used for measurement of pO_2 & pCO_2 .

3. Attempt any FOUR :**16**

- (a) Compare single beam filter photometer with double beam filter photometer.
- (b) List two applications each of (i) GCMS, (ii) LCMS.
- (c) Describe paper electrophoresis.
- (d) Describe gas chromatography with a neat diagram.
- (e) Describe Ozone measurement in air using conductivitymeter.

4. (A) Attempt any THREE : 12

- (a) Differentiate between gas chromatography and liquid chromatography.
- (b) Draw a neat diagram of complete blood gas analyzer.
- (c) Describe working of Infrared gas analyzer with a neat diagram.
- (d) State the principle of NMR.

(B) Attempt any ONE : 6

- (a) Describe with a neat diagram the SO₂ measurement using conductivity method.
- (b) State the role and atomizer in flame photometer. Also, describe discharge type atomizer.

5. Attempt any FOUR : 16

- (a) Describe working of multichannel photometer with a neat diagram.
- (b) Explain with a neat diagram the working of glass electrode.
- (c) Describe measurement of nitrogen oxide using CO laser technique.
- (d) Define chemiluminescence. Describe nitrogen oxide measurement using chemiluminescence.
- (e) Explain with a neat diagram the working principle of pH meter.
- (f) List two applications each :
 - (i) Gas Chromatography.
 - (ii) Liquid Chromatography.

P.T.O.

6. Attempt any FOUR :**16**

- (a) Describe magnetic deflection mass spectrometer with a neat diagram.
 - (b) Describe working of double beam densitometer with a neat diagram.
 - (c) Differentiate between colorimeter and spectrophotometer.
 - (d) Describe construction and working of NMR spectrometer.
 - (e) State the basic elements of Liquid Chromatography.
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