

17539

16172

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All questions are compulsory.
 - (2) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (3) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any THREE : 12

- (a) Describe the working principle of Mass spectrometer with suitable diagram.
- (b) State the use of buffer solution in blood pH measurement.
- (c) How to convert volumetric concentration of gas to gravimetric concentration of gas ?
- (d) Differentiate between photometer & spectrophotometer. (any 4 points)

(B) Attempt any ONE : 6

- (a) Explain with neat diagram basic elements of gas chromatography.
- (b) Draw block diagram of Analytical instrument & explain function of each block.

- 2. Attempt any FOUR :** **16**
- (a) State & explain Beer Lambert's Law.
 - (b) Give the comparison between gas chromatography & liquid chromatography. (any 4 pts.)
 - (c) Describe measurement technique for SO₂ using conductivity meter.
 - (d) Describe principle of operation of Nuclear Magnetic Resonance Spectroscopy.
 - (e) Write four types of gas pollutant with their typical concentration values.
 - (f) Draw & explain with neat diagram working of IR gas Analyzer.
- 3. Attempt any FOUR :** **16**
- (a) Describe operation of discharge type Atomizer used in flame photometer with neat diagram.
 - (b) What is resonance condition ? Describe Nuclear energy level in NMR Spectrometer.
 - (c) Describe construction & working of calomel electrode used for pH measurement.
 - (d) Describe briefly significance of chromatographic column used in chromatography.
 - (e) Describe how measurement of Nitrogen oxide is done using Co Laser.
- 4. (A) Attempt any THREE :** **12**
- (a) With block diagram, explain the working of liquid chromatography.
 - (b) Draw & labelled diagram of catheter tip electrode for measurement of PO₂ & PCO₂ in blood gas analyzer.
 - (c) Describe the working of thermal conductivity analyzer using thermistor with neat diagram.
 - (d) List any four applications of NMR.

- (B) Attempt any ONE :** **6**
- (a) Describe with neat diagram gas chromatography techniques for measurement of Carbon monoxide.
 - (b) Describe constructional details of flame photometer with neat diagram.
- 5. Attempt any FOUR :** **16**
- (a) State principle of calorimetric method. Describe working of double beam filter photometer with suitable diagram.
 - (b) Explain construction & working of null detector type pH meter.
 - (c) How measurement of ozone is done with the help of conductivity meter.
 - (d) Draw & describe circuit diagram for computation of total CO₂ for blood gas analyser.
 - (e) Define Chemiluminescence. How measurement of nitrogen oxide is done using Chemiluminescence.
 - (f) List any four applications of Chromatography.
- 6. Attempt any FOUR :** **16**
- (a) List any two applications of each
 - (i) GCMS
 - (ii) LCMS
 - (b) What is electrophoresis ? List part of electrophoresis apparatus.
 - (c) Draw optical diagram of spectrophotometers using prism. State role of prism in it.
 - (d) Describe with neat diagram Time of flight mass spectrometer.
 - (e) Give classification of chromatography. Also enlist different detection system used in chromatography.
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