17539

11718

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (a) Attempt any THREE : **12**

(i) What is Electrophoresis ? List the parts of electrophoresis apparatus.

(ii) State and explain the principle of mass spectrometer.

(iii) Explain the principle of working of Infrared gas analyzer with block diagram.

(iv) Write the general equation of representation of concentration of gases. State the importance of each term in equation.

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

(i) Draw the block diagram of analytical instruments and explain the function of each block.

(ii) State the principle of chromatography. Classify the chromatography in detail.

2. Attempt any FOUR : **16**

(a) State and explain Beer-Lambert's laws.

(b) Define chromatography. What is the significance of column length on chromatogram ?

(c) List the types and concentration of various gas pollutants.

(d) Explain in brief the term Chemical Shift with its mathematical expression.

(e) Draw and explain ozone measurement using conductivity meter.

(f) Draw the block diagram of thermal conductivity analyzer using thermistor and explain in brief its working.

3. Attempt any FOUR : **16**

(a) Draw the schematic of double beam filter photometer and explain its working in brief.

(b) State the applications of NMR spectroscopy. (any 4)

(c) What is pH ? Explain in brief the principle of pH measurement.

(d) State the two applications of each :

(i) Gas Chromatography and (ii) Liquid Chromatography.

(e) Draw and explain the measurement of Nitrogen oxide using Co Laser.

4. (a) Attempt any THREE : **12**

(i) Draw and explain the schematic of gas chromatography (GC).

(ii) Draw the labelled diagram of complete – blood gas analyzer.

(iii) Draw and describe circuit diagram for calculation of total CO_2.

(iv) State and explain the principle of NMR.

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

(i) Draw and explain SO_2 measurement using conductivity method.

(ii) State the principle of colorimeter. Draw the schematic and explain the working of single beam filter photometer.

5. Attempt any FOUR : **16**

(a) Explain in brief the significance of prism and gratings in spectrophotometer.

(b) Draw and explain the constructional details of glass electrode used for pH measurement.

(c) Define Chemiluminescence. How measurement of Nitrogen oxide is done using chemiluminescence ?

(d) Draw and explain the catheter tip electrode for measurement of pO_2.

(e) Explain in brief CO_2 measurement using gas chromatography.

(f) State the principle of Liquid Chromatography.

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6. Attempt any FOUR : **16**

(a) Draw the block diagram of NMR spectrometer.

(b) Draw and explain the calomel electrode's construction details.

(c) State and explain the principle of flame photometer with neat diagram.

(d) Draw and explain the operation of time of flight mass spectrometer.

(e) List the basic elements of Liquid chromatography and explain their functions.
