17539

21819

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

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

Marks

1. (A) Attempt any THREE of the following : **12**

(a) Draw the block diagram of analytical instrumentation system. State the function of each block.

(b) List any four applications of NMR.

(c) Draw a labelled diagram of catheter tip electrode for measurement of pO_2 and pCO_2 in blood gas analyzer.

(d) Describe how measurement of Nitrogen oxide is done using CO Laser.

(B) Attempt any ONE of the following : **6**

(a) (i) Define pH. List the types of electrodes used for pH measurement.

(ii) Explain the construction and working of null detector type pH meter.

(b) State principle of gas chromatography. Explain gas chromatography with neat diagram.

2. Attempt any FOUR of the following : **16**

(a) Draw the block diagram of flame photometer and explain its working.

(b) Draw a neat block diagram of liquid chromatography. What is the role of high pressure pump in it ?

(c) Describe with neat diagram ozone measurement method using conductivity meter.

(d) State the basic principle of NMR. Explain resonance condition in NMR.

(e) Write different types of gas pollutants. State its typical concentration.

(f) Explain the working principle of thermal conductivity meter using thermistor with neat diagram.

3. Attempt any FOUR of the following : **16**

(a) State Beer Lambert's law. Give its mathematical expression.

(b) Draw a labelled diagram of magnetic deflection mass spectrometer.

(c) With neat labelled diagram, explain working of paper electrophoresis.

(d) Explain significance of chromatographic column used in chromatography.

(e) Describe measurement technique for SO_2 using conductivity meter.

4. (A) Attempt any THREE of the following : **12**

(a) Give four differences between gas chromatography and liquid chromatography.

(b) Draw a neat labelled block diagram of complete blood gas analyzer.

(c) Describe in brief the working of infrared gas analyzer.

(d) Describe with neat labelled diagram time of flight mass spectrometer.

(B) Attempt any ONE of the following : **6**

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

(b) Give significance of atomizer. Describe any one type of atomizer used in flame photometer.

5. Attempt any FOUR of the following : **16**

(a) Explain working of prism as monochromator with the help of neat diagram.

(b) Describe the working principle of double beam densitometer with neat diagram.

(c) Describe the measurement of CO using gas chromatography.

(d) Explain in brief the effect blood on electrode. State the use of buffer solution.

(e) Define :

(i) Environment

(ii) Pollutant

(iii) Air pollution

(iv) Acid rain

(f) Give four applications of GC & LC each.

6. Attempt any FOUR of the following : **16**

(a) Define :

(i) Chemical shift

(ii) Nuclear spin

(b) Describe calomel electrode with neat diagram.

(c) Compare single beam and double beam filter photometer. (any four points)

(d) Describe the constructional detail of NMR spectrometer with neat diagram.

(e) In chromatography, if the temperature of oven increases, what will be its effect on retention time and chromatogram ?
