17539

14115

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) 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 <u>THREE</u> of the following:** **12**

(i) State the use of buffer solution in blood pH measurement.

(ii) Explain the elements of analytical instruments with help of a block diagram.

(iii) Give any four applications of liquid chromatography.

(iv) State four major gas pollutants, along with their typical concentration.

b) **Attempt any <u>ONE</u> of the following:** **06**

(i) What is monochromator? Explain working of prism as monochromator with the help of neat diagram.

(ii) Describe the conductivity method for measurement of SO_2 in air, with a neat labelled diagram.

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Marks

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

a) Give the classification of chromatography. Explain any one of them in brief.

b) State the representations of volumetric and gravimetric concentration of gases.

c) Draw a labelled diagram of Catheter tip electrode for measurement of pO_2 and pCO_2 in blood.

d) What is pH? Explain the principle of pH measurement.

e) Describe the discharge type atomizer with neat schematic diagram.

f) Explain the term chemical shift with it's mathematical expression.

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

a) Draw a neat labelled diagram of double beam densitometer and explain it's working.

b) Draw a labelled block diagram of gas chromatography and give it's working principle.

c) Give any four applications of NMR.

d) Describe the Chemiluminescence technique used for the measurement of Nitrogen oxide.

e) Explain the working principle of IR gas analyzer.

Marks

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

(i) Draw the schematic diagram of a Time-of-Flight mass spectrometer and explain it's working.

(ii) How to convert volumetric concentration of gas to gravimetric concentration of gas?

(iii) State and explain Beer Lambert Law.

(iv) Explain the constructional details of glass electrode used for pH measurement with the help of neat schematic diagram.

b) **Attempt any ONE of the following:** **06**

(i) Describe the working of thermal conductivity gas analyzer with a neat schematic diagram.

(ii) With a neat diagram explain liquid Chromatography. State its application.

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

a) List the basic components of mass spectrometer and explain any one of them in brief.

b) State the principle of Colorimeter. Explain the working of single beam filter photometer with neat labelled diagram.

c) Why the column temperature is so critical in gas Chromatograph?

d) Explain the gas chromatography technique for the measurement of carbon monoxide in air.

e) Explain the principle of Electrophoresis. State it's applications (any two).

f) Draw a labelled block diagram of GCMS.

Marks

6. Attempt any <u>FOUR</u> of the following: **16**

a) State the applications of flame photometry (any four).

b) State the principle of NMR. Explain the resonance condition of NMR.

c) Draw the neat labelled block diagram of complete blood gas analyzer.

d) Describe the ozone measurement using conductivity metry with the help of neat schematic diagram.

e) Compare single beam and double beam filter photometer.