17539

15162

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****.*

Marks

1. A) Attempt **any three** : **12**

a) Draw block diagram of analytical instrumentation system. State f^n 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) State type and concentration of various gas pollutants.

B) Attempt **any one** : **6**

a) State principle of mass spectrometer. Describe magnetic deflection (Nier 60 sector) type with neat diagram.

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

2. Attempt **any four**: **16**

a) Describe working of spectrophotometer using grating.

b) State principle of chromatography. Give detail classification of chromatography.

c) Explain with neat diagram carbon monoxide measurement method using gas chromatography.

d) Define Nuclear spin and nuclear energy level.

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

f) State principle of infrared gas analyzer. Give its two application.

3. Attempt **any four**: **16**

a) Give four differences between single beam filter photometer and double beam filter photometer.

b) Give two applications of :

i) GCMS ii) LCMS

c) Explain Null detector type pH meter with neat diagram.

d) Describe function of basic element of liquid chromatography.

e) With neat block diagram describe SO_2 measurements technique using conductivity method.

P.T.O.

Marks

4. A) Attempt **any three** : **12**

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

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

c) How catheter tip electrode is used for measurement of pO_2 and pCO_2 ?

d) Describe constructional detail of NMR spectrometer.

B) Attempt **any one** : **6**

a) Describe Nitrogen Oxide measurement method using Chemiluminescence with neat diagram.

b) Give significance of Atomizer. Describe integral burner type of Atomizer used in flame photometer.

5. Attempt **any four** : **16**

a) Describe constructional detail of flame photometer with neat diagram.

b) What is electrophoresis ? Give significance of paper electrophoresis.

c) Give general equation for representation of concentration of gases. State significance of each term.

d) In chromatography, if the temperature of oven increases, what will be its effect on retention time and chromatogram ? Describe in brief.

e) What is effect of blood on electrode. State use of buffer solution.

f) Give four application of GC and LC each.

6. Attempt **any four** : **16**

a) State four application of NMR spectrometer.

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

c) State Beer-Lambert's Law. Describe principle of colorimeter.

d) Give significance of chemical shift and resonance condition w.r.to NMR spectrometer.

e) List any four analytical instrument based on Beer-Lambert's law. Give significance of prism and grating.
