



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH (ICE)/SEP. SUPPLE/SEM-8/EI-801C/2012

2012

ANALYTICAL INSTRUMENTATION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) The cgs physical unit for dynamic viscosity is
 - a) poise
 - b) pascal-second
 - c) gm/s
 - d) kg/s.
- ii) The pH value of *alkaline* content is
 - a) >7
 - b) <7
 - c) =7
 - d) none of these.
- iii) Dew point is expressed as
 - a) %(percentage)
 - b) °C
 - c) V_{ppm}
 - d) none of these.
- iv) Water vapour absorbs mainly the radiation in the range of
 - a) IR ray
 - b) X ray
 - c) γ ray
 - d) UV ray.

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- xii) Specific gravity of any gas is the ratio of the
- density of the gas and density of hydrogen at STP
 - density of the gas and density of water at STP
 - density of the gas and density of air at STP
 - none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- What is the difference between instrumentation and analytical instruments ? What is inline and offline instruments ? $2 + 3$
- State the basic principle of mass spectrometer. 5
- Describe the operating of paramagnetic type oxygen analyzer. 5
- What do you mean by humidity ? What is dew point, vapour pressure, absolute humidity ? $2 + 3$
- What is polarization ? How can it be minimized or eliminated ? $2 + 3$

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

- Why is analytical instrumentation system necessary in industrial process ? What do you mean by online instruments ? Describe with neat diagram the working of thermal conductivity type gas analyzer. $4 + 3 + 8$



8. What do you mean by chromatography ? Classify it. Describe in brief the working of a typical gas chromatographic system. What are the applications of Gas chromatography ?

2 + 3 + 7 + 3

9. Write in brief the techniques of density measurement of solids, liquids and gases.

5 + 5 + 5

10. a) Define relative humidity
b) Describe hair hygrometer with diagram
c) The reading of dry and wet bulb are 18°C and 16°C .
What is the value of RH ?

4 + 6 + 5

11. Write short notes on any *three* of the following :

3 × 5

- a) X-ray spectrometer
- b) pH measurement
- c) IR sources
- d) Katharometer
- e) Flame Ionization detector.

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