

This question paper contains 4 printed pages.

3166

Your Roll No.

MEC

J

Paper - CE.606

INSTRUMENTATION

Time : 3 hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Question No. 1 is compulsory and attempt
any four questions from the rest.*

Assume the missing data, if any.

1. (a) Explain the principle of working of thermocouple. State the law of intermediate temperature and intermediate metals for thermocouple.
- (b) Enumerate the various methods for measurement of velocity of flow. How does the measurement of compressible flow differ from that of incompressible flow? What devices are used for measurement of compressible flow?
- (c) Write down the calibration technique of chromatograph.
- (d) Define the terms: Sensitivity, Precision and Accuracy of an instrument.

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- (e) Differentiate potentiometric analysis and polarographic analysis. $4 \times 5 = 20$

2. (a) Explain the terms:

- (i) Absolute pressure
- (ii) Gauge pressure
- (iii) Differential pressure
- (iv) Static and stagnation pressure.

What are the various units used for pressure measurement? 10

- (b) Compare the relative merits and demerits of venturimeter, nozzle-meter and orifice-meter together with their sketches. 10

3. (a) Compare and contrast the advantages and limitation of resistance thermometer and thermistors. 5

(b) Explain the principle and application of the following:

- (i) McLeod gauge
- (ii) Ionization gauge
- (iii) Thermal conductivity gauge. 15

4. (a) Sketch and explain the principle, working and application of electromagnetic flow meter.

- (b) Explain the methods used to measure the output from thermocouple. Explain the principle of working of a mercury in glass thermometer and major cause of error. 20
5. (a) What do you mean by chromatography? Write down the field of application and limitation of this technique. Name the different techniques used in chromatography in very brief. 10
- (b) Write down the important considerations which are kept in view while designing column ovens for gas chromatography. 5
- (c) Explain the factors taken into consideration in selecting a particular type of detector in gas chromatography. 5
6. Explain the principle and application of the following:
- (i) Mass Spectrometer
 - (ii) Nuclear Magnetic Resonance (NMR)
 - (iii) Atomic Absorption Spectrophotometer
 - (iv) Spectrophotometer (UV-VIS). $5 \times 4 = 20$
7. Write short notes on (any four):
- (i) Argon Ionization Detector
 - (ii) N.D.I.R.
 - (iii) H.P.L.C.