

Total number of printed pages = 5

19/6th Sem/DIE 601

2022

INDUSTRIAL INSTRUMENTATION - II

Full Marks - 100

Time - Three hours

The figures in the margin indicate full marks for the questions.

Answer PART-A and PART-B.

PART - A

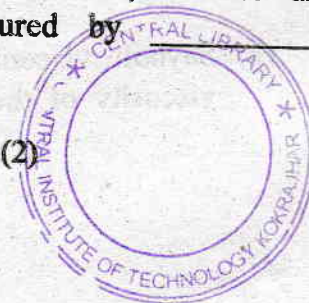
Answer *all* the questions :

1×20=20

1. (a) Fluidity is the reciprocal of _____.
- (b) _____ type of densitometer uses thermistors in it.
- (c) _____ is expressed in terms of length of the liquid column.
- (d) _____ is the heart of chromatograph.
- (e) Saybolt viscometer measures _____ viscosity of the fluid.

[Turn over

- (f) _____ type of viscometer uses bobs in it.
- (g) _____ level gauge uses piezoelectric element in it.
- (h) Float type densitometer uses different _____ floats in it.
- (i) Saybolt number is the _____ required to drain 60cc of liquid through the capillary.
- (j) _____ is the process of separating, isolating, identifying and quantifying the components in the complex mixture.
- (k) In head type flowmeter, volumetric flow rate is directly proportional to _____.
- (l) _____ is an area type flowmeter.
- (m) Ultrasonic flowmeters are suitable for _____ flow rates.
- (n) _____ flowmeters are suitable for steady flow measurements.
- (o) Mass flow rates of foams, slurries and mixtures are measured by _____ flowmeter.



- (p) The ratio of moisture content of the gas to the maximum moisture the gas can contain at that temperature is called _____.
- (q) _____ consist of a pair of glass bulb thermometer.
- (r) _____ is used as a material for coating in electrical type humidity transducer.
- (s) Dielectric constant of a material changes with change in _____.
- (t) Hazardous areas are classified into _____ zones.

PART - B

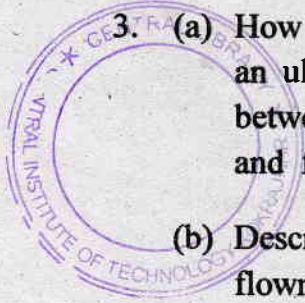
Answer any *four* questions :

20×4=80

2. (a) Describe the basic principles of working of head type flowmeters with mathematical expressions. 7
- (b) Draw the diagram of rotameter and explain its operation with suitable mathematical relations. 7
- (c) Describe the working of nutating disc type positive displacement flowmeter with a suitable diagram. 6

54/19/6th Sem/DIE 601 (3)

[Turn over



3. (a) How the velocity of a fluid is measured in an ultrasonic flowmeter ? Derive a relation between transmit time of ultrasonic waves and fluid flow velocity. 8

(b) Describe the working of Coriolis mass flowmeter with a suitable diagram. 7

(c) Differentiate between orifice plate and venturimeter. 5

4. (a) Define specific viscosity and kinematic viscosity. Also write its SI unit. 4

(b) Explain the construction and working of a viscometer which measures kinematic viscosity. 8

(c) Explain a method for solid level measurement. 8

5. (a) Define density and write its SI unit. 2

(b) Explain a densitometer used for gas density measurement. 6

(c) Explain any two types of densitometer used for liquid density measurement. 12

6. (a) Describe the construction and working of a commercial psychrometer for humidity measurements. 6
- (b) Explain the working of resistive and capacitive type moisture sensor. 8
- (c) Draw the diagram of a commercial dew point meter and describe its operation. 6
7. (a) Write short notes on any *two*: $6 \times 2 = 12$
- (i) Hazardous area classification.
 - (ii) Intrinsic safety and explosion proof.
 - (iii) Smoke and fire detection system.
- (b) What are the types of interferences in a measurements system? Explain each of them. Mention some of the methods used for elimination of interferences. 8

