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.

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(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

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 restive 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* : 6×2=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