Total No. of printed pages = 6

END SEMESTER EXAMINATION – 2020

Semester : 6th

Subject Code : CAI-612

INDUSTRIAL INSTRUMENTATION

Full Marks – 70

Time – Three hours

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

Instructions :

1. *All* questions of PART – A are compulsory.
2. Answer any *five* questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

   (a) 10 Torr = _____ mm of Hg.

   (b) 10 poise = _____ N-sec/m^2.

   (c) 15 N/m^2 = _____ Pascal.

[Turn over

(d) Tachometer is used for measuring _____.

(e) _____ of LVDT acts as mass in the LVDT accelerometer.

(f) Chromel Constantan is the metal alloys used to construct _____ thermocouple.

(g) _____ is used for the static calibration of pressure gauges above 200 KN/m^2.

(h) Saybolt number is the _____ required to drain 60cc of liquid through the capillary.

(i) _____ are the detectors in hot wire gas bridge type densitometer.

(j) _____ is a non-contact type thermometer.

2. Write true or false : 1×5=5

(a) Weighted floats are used in displacer type densitometer.

(b) The unit of kinematic viscosity is Stokes.

(c) Water is not a manometric liquid.

(d) Linear velocity is measured using stroboscope.

(e) Load cell is used for displacement measurement.

3. Choose the correct answer : 1×5=5

(a) In which densitometer the density is proportional to the weight of a given volume of a fluid.

(i) Pressure head type

(ii) Displacer type

(iii) Float type

(iv) Hot wire gas bridge type

(b) Which thermometer works with the principle of Seebeck effect ?

(i) RTD (ii) Thermocouple

(iii) Pyrometer (iv) Thermistor

(c) In which tachometer the angular velocity is proportional to number of frequency changes per unit time

(i) Capacitive type

(ii) Inductive type

(iii) Drag cup

(iv) Photoelectric type

(d) An accelerometer can be used to measure

(i) Pressure (ii) Vibration

(iii) Force (iv) Viscosity

(e) A thermal conductivity gauge for low pressure measurement is

(i) Bridgeman gauge

(ii) Ionization gauge

(iii) Pirani gauge

(iv) McLeod gauge

4. Match the following : 1×5=5

(a)	LVDT	(i)	Alcohol
(b)	Thermometer	(ii)	Accelerometer
(c)	Ionization gauge	(iii)	Active transducer
(d)	Shock	(iv)	Passive transducer
(e)	Tachogenerator	(v)	Gas

PART – B

Marks – 45

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

(b) Explain the construction and working of any two types of tachometers. 7

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

(b) Explain the construction and working of any two types of electrical thermometer. 7

7. (a) Define specific viscosity and relative viscosity. 3

(b) Explain the construction and working of a viscometer which measures kinematic viscosity. 6

8. Explain the construction and working of the following :

(a) Bridgeman gauge 4

(b) Ionization gauge 5

9. Explain the construction and working of the following :

(a) Float type densitometer. 4

(b) Potentiometric accelerometer. 5

10. Explain the construction and working of strain gauge based load cells. 9