Total number of printed pages:02 **Diploma(D)/5th/DIE502**

2022

Industrial Instrumentation-1

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions.*

1.	a)	Define any five performance characteristics of an instrument?	10
	b)	What is strain gauge and derive expression for gauge factor?	10
2.	a)	Describe, with the neat sketch, the construction and working of pressduction load cell with its advantages and disadvantages?	6
	b)	Explain, with neat sketches, the construction and working of in-line stationary torque sensors and in-line rotating torque sensors?	10
	c)	It was observed under test that a piece of brass 40 cm long and with a cross-sectional area of 1.4 cm^2 was elongated to 0.065 cm. what was the force applied to the sample(Young's modulus 'E' for brass is $9.66x10^5$ kg/cm^2 ?	4
3.	a)	Explain the construction and working principle of photo electric speed sensor and eddy current drag-cup tachometer? (5M+8M)	5+8=13
	b)	Calculate the specific gravity of $2m^3$ volume of a material which 2000 kgf?	2
	c)	In a speed measurement using stroboscope, the larger rate of flashes per minute to achieve synchronism is 2500 flashes per minute. Then the flashing rate is slowly reduced to attain synchronism again at 1500 flashes/min. Calculate the speed & if the above process is followed until to get 3rd, 5th & 7th time synchronism for the same speed, what may be the flashing rate?	5
4.	a)	Convert temperature -30 °C into degree Fahrenheit, degree Kelvin & degree Rankine.	6
	b)	Explain the types, construction and working principle of RTD? Give the advantages and disadvantages?	10
	c)	How the temperature measurements are classified?	4

		<table><tr><th>Class</th><th>Filled Fluid</th><th>Principles</th></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	
5.	a)	Describe the working principle and construction of optical pyrometer with neat sketch?	10
	b)	Explain any one method for pressure measurement in manometer type and elastic pressure transduced?	5+5=10
6.		Explain, with a neat sketch the construction and working of a hot cathode ionization gauge and McLeod gauge?	10+10=20
7.	Write short notes on *any four* of the following		4x5=20
	a)	Thermocouple	
	b)	Dead weight tester	
	c)	Pressure thermometer	
	d)	Capacitive transducer	
	e)	LVDT	
	f)	Seismic (absolute) accelerometer pickup	

END