SC

(28/A-13)

SARDAR PATEL UNIVERSITY

B. Sc, 6th Semester

Thursday

4th April 2019

Session: Morning, Time: 10:00 to 01:00 PM Subject Code: (PHYSICS) US06CPHY06 Subject Title: Instrumentation and sensors

Max Marks: 70

				[10	
lue:1	Write correct answer for each of the following MCQs.				
	1	The value of gauge factor for semico	nductor strain gauge is between		
		a) 100 to 200	b) 2 to 3		
		c) 10 to 20	d) 200 to 300		
	2	Eddy current transducer is a	type transducer.		
		a) capacitive	b) inductive		
		c) piezo-electric	d) resistance		
10. gt 4	3	In piezo-electric transducer, when a	material is distorted an electrical charge is		
		produced.			
		a) solid	b) liquid		
		c) crystalline	d) gaseous		
	4		ressure between and microns.		
		a) 0.1, 100	b) 0.01, 100		
		c) 0.02, 2000	d) 0.01, 1000		
	5	The atmospheric pressure at sea lev			
		a) 760	b) 670		
		c) 680	d) 860		
	6	has negative temperature co			
		a) Platinum	b) Thermistor		
	_	c) Aluminium	d) Copper		
	7		e temperature of the source without direct contact	•	
		is	b) Electrical resistance thermometer		
		a) Thermocouple	,		
-		c) Pyrometer	d) Metallic resistance thermometer		
	8	Microphone hasto convert			
		a) parallel plates	b) air gap		
		c) polarising voltage	d) diaphragm	f	
	9	Infrared spectrometry is useful	in qualitative and quantitative determination o	•	
			h) Colide		
		a) Organic gases and liquids	b) Solidsd) gases		
		c) liquids	, -	r	
	10		f when a moving conductor is placed in a magneti	•	
,		field.	b) Electrodynamic type		
		a) Piezo-electric crystal type	d) condenser type		
		c) Electret type	u) condenser type	•	

Que:2	Write answers of any ten questions in brief.
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[20]

Que:2	Wr	Write answers of any ten questions in brief.		
	1	Mention the main advantages of getting an electrical signal as an output of any transducer element.		
	2	For resistance strain gauge explain the method of temperature compensation obtained with a dummy gauge.		
	3	For a capacitive transducer consists of two plates of diameter 2 cm each separated by an air gap of 0.25 mm, find the displacement sensitivity.	- ''s !	
	4	Explain in brief about photoconductive transducer.		
	5	Enlist the desirable characteristics of a manometer fluid.		
	6	Name the gauges used for low pressure measurement.		
	7	Enlist the principles on which non-electrical methods of temperature measurement are based upon.		
	8	What is a thermocouple? State peltier effect.		
	9	Mention advantages and disadvantages of bimetallic thermometer.		
	10	Draw schematic diagram of non-dispersive infrared gas analyser.		
, a grand	11	What is a biosensor? State its important features.		
	12	Draw schematic diagram of capacitor type microphone.		
Que:3		Explain the principle of inductive type transducer and explain self generating and non-self generating inductive type transducers. OR	[10]	
		What is CRO? Explain its working principle. Draw block diagram of the CRO and explain the function of each of its components.	[10]	
Que:4	[A]	What are manometers? For inclined tube manometer, obtain formula for pressure difference $P_1 - P_2 = 9gh_2$.	[06]	
	[B]	Write a note on Pirani gauge.	[04]	
		OR	[04]	
Que:4	[A]	State the principle of technique used in high pressure measurement. Also obtain the expression for sensitivity of transducer used to measure high pressure.	[06]	
	[8]	Write a note on ionisation transducer.	[04]	
Que:5	[A]	Name the two electrical methods used for temperature measurement. With schematic diagram, explain platinum resistance thermometer.	[06]	
	[B]	Write a note on solid rod thermometer.	[04]	
		OR		
Que:5	[A]	Explain the construction and working of disappearing filament type of optical pyrometer.	[06]	
	[B]	State advantages of semiconductor resistance sensors.	[04]	
Que:6	[A]	Draw the schematic diagram of ORSAT apparatus for exhaust gas analysis and explain its working.	[06]	
	[B]	Mention about the advantages of optical fibre sensors. OR	[04]	
Que:6	[A]	crystal type microphone.	[06]	
	[B]	What is a smart sensor? Explain it with necessary diagram. * * * *	[04]	
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