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Question Paper Code: 31421

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fourth Semester

Electronics and Instrumentation Engineering

EI 2252/EI 42/EI 1252/10133 EI 403/080300010 — TRANSDUCER ENGINEERING

(Common to Instrumentation and control Engineering)

(Regulation 2008/2010)

(Common to PTEI 2252 Transducer Engineering for B.E.(Part-Time) Third Semester-Electronics and Instrumentation Engineering-Regulation 2009)

Time: Three hours

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Maximum: 100 marks

Answer ALL questions.

$PART A - (10 \times 2 = 20 \text{ marks})$

- 1. What do you mean by static calibration?
- 2. Differentiate active and passive transducers.
- 3. State the importance of resolution for a measuring instrument.
- 4. Find the settling time for 5% error in the step response of a first-order instrument with a time constant of 12 sec.?
- 5. Mention any four applications of strain gauge in measurements.
- 6. How is resistance of metals related with temperature? Write the equation for the relation.
- 7. What is an El Pick up?
- 8. How a capacitive transducer is used as pressure sensor?
- 9. Write the principle of piezoelectric transducer.
- 10. How a smart sensor differs from ordinary sensor?

PART B - (5 × 16 = 80 marks)

- 11. (a) (i) Explain in detail the classification of errors in instruments and also explain the causes and remedies for them. (10)
 - (ii) Differentiate fundamental and derived units with examples. (6)

		and	produc	es the	follov	ving r	esults	3.					
		Tem	p °C	397	398	399	400	401	402	403	404	405	• .
		Free	quency	1	3	12	23	37	16	4.	2	2	
		Calc	ulate								•		-
	¥	(i)	Arith	metic l	Mean,	•	-			•			•
		(ii)	Stand	ard D	eviati	on,	•	·		•		•	
		(iii)	Proba	ble of	error	of one	e read	ing,					• .
		(iv)	Stand	ard D	eviati	on.			•				-
12.	(a)	Derive the response of the underdamped Second order transducer for a step input.											
		•	· •		•		Or						
	(b)	char		tics of	instr	umen	ts. De	erive t	he eq	uatior		-	dynamic parameter
13 .	(a)	Describe the construction of different types of strain gauge and working principle.											
						•	Or						•
	(b)	(i)	Expla			ciple	of or	eratio	n an	d con	struct	ion of	hot wire (8)
		(ii)	Descr			rocedi	ire f	or m	easur	ing h	umid	ity u	sing hair (8)
14.	(a) .	Describe the principle of operation, construction and characteristics of LVDT with necessary diagrams.											
				-			Or			·		•	•
	(b)	(i)	Descri		ie co	nstruc	ction	and	worki	ng of	vari	able	reluctance (8)
	•	(ii)	Expla		oper	ation	of ca	pacito	r mic	ropho	ne wi	th its	frequency (8)
15.	(a)	(i)	Descri DC SC								•••		vorking of (10)
•		(ii)	Explai	in the	princ	iple of	f Hall	Effect	trans	ducer	'8.		(6)
			•				Or	· .			_		
	<i>a</i> .	(i)	Fymlai			. •	c 1						
	(b)	\- /	it in d		opera	ition (of pho	totran	sistor	and a	any or	ie app	lication of (8)

In a test, temperature is measured 100 times with variation in apparatus