Question Paper Code	14280

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025
Third Semester
Electronics and Instrumentation Engineering
20EIPC302 - SENSORS AND TRANSDUCERS
Regulations - 2020

Duration: 3 Hours   Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	Identify which of the following one is a passive transducer. (a) Thermocouple (b) Strain Gauge (c) Photodiode (d) Piezoelectric sensor	1	K1	CO1
2.	Static calibration of a transducer involves: (a) Testing the dynamic response (b) Comparing the output with a known input (c) Analyzing the phase shift (d) Measuring temperature variations	1	K2	CO1
3.	Interpret a measurement system with an accuracy of ±1% (a) The error is 1% of the full-scale value (b) The resolution is 1% (c) The precision is 1% (d) The instrument measures 1% more than the actual value	1	K2	CO2
4.	Which static characteristic affects both accuracy and resolution in a measurement system? (a) Sensitivity (b) Linearity (c) Precision (d) Range	1	K1	CO2
5.	In an RTD, the relationship between temperature and resistance is typically: (a) Exponential (b) Logarithmic (c) Linear over a specific temperature range (d) Non-linear across the entire range	1	K2	CO3
6.	Potentiometers are typically limited in high-frequency applications due to: (a) Low resistance changes (b) Slow response to rapid input changes (c) Non-linear behavior (d) Limited mechanical durability	1	K1	CO3
7.	The type of output signal of LVDT is (a) Digital (b) Linear analog (c) Non-linear analog (d) Pulse-modulated	1	K1	CO4
8.	Variable reluctance transducers are primarily used to measure: (a) Displacement and vibration (b) Temperature and humidity (c) Pressure in gaseous systems (d) Light intensity	1	K1	CO4
9.	The Hall Effect is based on the production of voltage when: (a) A magnetic field is applied perpendicular to an electric current (b) Mechanical stress is applied to a material (c) Light strikes a semiconductor (d) Heat is applied to a crystal	1	K2	CO5
10.	Digital transducers are typically used in: (a) Systems requiring continuous analog signals (b) Systems requiring high-precision digital data output (c) Low-cost, low-precision applications (d) Systems where real-time analog output is needed	1	K1	CO5

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K – Level	CO
11.	Define Passive Transducer.	2	K1	CO1
12.	Distinguish the relationship between calibration and accuracy.	2	K2	CO1
13.	What is an analog transducer?	2	K1	CO2
14.	Interpret Threshold voltage.	2	K2	CO2
15.	List the applications of thermistors.	2	K1	CO3

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   **14280**

16.	Define young's modulus.	2	K2	CO3
17.	Will the temperature coefficient of resistance affect the accuracy of a piezo-resistive sensor or not. Justify your answer.	2	K2	CO4
18.	Discuss the applications of LVDT.	2	K2	CO4
19.	Discuss the synchros functions in angular displacement measurement.	2	K2	CO5
20	List the applications of a capacitive proximity sensor.	2	K1	CO5
21.	Write the applications of fiber optic sensors in industrial settings.	2	K1	CO6
22.	Infer the detection of magnetic field using hall effect.	2	K2	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Illustrate the different type of errors in measurement systems.	11	K2	CO1
		OR			
	b)	Elucidate the principle of functional elements of measurement system.	11	K2	CO1
24.	a)	Discuss the importance of Linearity and Sensitivity in design of measurement system.	11	K2	CO2
		OR			
	b)	Describe the zero order and first order system with example.	11	K2	CO2
25.	a)	Elucidate the construction, working, characteristics and applications of strain gauges.	11	K3	CO3
		OR			
	b)	Compare the construction and working principles of a hot-wire anemometer and a piezo-resistive sensor in terms of sensitivity and response time.	11	K3	CO3
26.	a)	Identify the principle of following transducer and mention its medical applications (i) Thermocouple (ii) LVDT	11	K3	CO4
		OR			
	b)	Identify the role of signal conditioning in capacitive sensors and its importance in practical applications.	11	K3	CO4
27.	a)	Develop an integration system of MEMS & nano sensors to act as wearable health monitoring system.	11	K2	CO5
		OR			
	b)	Illustrate an integrated sensor system using Hall Effect transducers and fiber optic sensors to monitor both mechanical stress and environmental pollution in a smart city infrastructure.	11	K2	CO5
28.	a)	Explain about the Digital Transducers in detail note.	11	K2	CO6
		OR			
	b)	Describe the working of smart sensor with a neat block diagram.	11	K2	CO6