Reg. No.																

Question Paper Code	14633

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2026

Third Semester

Electronics and Instrumentation Engineering

20EIPC302 - SENSORS AND TRANSDUCERS

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART – A (i) (MCQ)
(16 × 1 = 16 Marks)
Answer ALL Questions

		Marks	K – Level	CO
1.	A meter reads 105.50 V and the true value of the voltage is 105.45 V. Determine the static error for the instrument. a) 0.02V b) 0.05V c) 0.04V d) 0.06V	1	K2	CO1
2.	A 0-250 V voltmeter has a guaranteed accuracy of 2% of full-scale reading. The voltage measured by the voltmeter is 150 volts. Determine the limiting error in percentage. a) 0.025 b)0.033 c) 0.066 d)0.01	1	K3	CO1
3.	In which of the following transducer the change in resistance of metal wire due to the change in temperature known by the measurement of temperature? a) Resistance thermometer b) Resistance Strain gauge c) Resistance Hygrometer d) Hot wire meter	1	K1	CO1
4.	Two instruments measure the same quantity. Instrument A gives readings close to the true value, while Instrument B gives highly repeatable readings. This shows that: a) A is precise, B is accurate b) A is accurate, B is precise c) Both are accurate d) Both are precise	1	K3	CO2
5.	A second-order transducer is critically damped when it: a) Oscillates continuously b) Responds slowly with large overshoot c) Reaches final value quickly without oscillation d) Produces sinusoidal output only	1	K2	CO2
6.	Which characteristic determines the smallest change in input that can be detected by an instrument? a) Sensitivity b) Resolution c) Accuracy d) Span	1	K1	CO2
7.	Platinum is commonly used in RTDs because of its: a) Low sensitivity b) High magnetic property c) Stable resistance characteristics d) Low conductivity	1	K1	CO3
8.	Piezo-resistive sensors are preferred in MEMS applications due to: a) Large size b) Ease of integration with semiconductor fabrication c) Low sensitivity d) Mechanical contacts	1	K2	CO3
9.	A strain gauge connected in a Wheatstone bridge improves: a) Frequency stability b) Measurement sensitivity and accuracy c) Humidity response d) Mechanical strength	1	K3	CO3

10.	Synchros are mainly used for: a) Temperature compensation b) Pressure amplification c) Current measurement d) Remote transmission of angular position	*1*	*K1*	*CO4*
11.	The major limitation of capacitive transducers is their: a) Poor frequency response b) Sensitivity to stray capacitance c) Inability to detect displacement d) Low sensitivity	*1*	*K2*	*CO4*
12.	A piezoelectric transducer is best suited for measuring: a) Static displacement b) Dynamic vibration c) Humidity d) Light intensity	*1*	*K3*	*CO4*
13.	Fiber optic sensors are preferred in hazardous environments because they are: a) Heat generating b) Highly magnetic c) Immune to electromagnetic interference d) Electrically conductive	*1*	*K1*	*CO5*
14.	Film sensors are mainly preferred because they are: a) Rigid and bulky b) Heat resistant only c) Highly magnetic d) Flexible and lightweight	*1*	*K2*	*CO5*
15.	Nano sensors are highly effective in biomedical applications because they can: a) Detect very small biological changes b) Generate large mechanical motion c) Operate without sensitivity d) Reduce optical signals	*1*	*K3*	*CO5*
16.	Smart sensors in IoT applications mainly help in: a) Increasing mechanical wear b) Reducing automation capability c) Eliminating sensors completely d) Real-time monitoring and data communication	*1*	*K3*	*CO5*

PART – A (ii) (Short Answer Questions)
(8 × 3 = 24 Marks)
Answer ALL Questions

17.	Inspect a suitable transducer for measuring liquid level in an industrial tank and justify your choice.	*3*	*K4*	*CO1*
18.	Apply calibration procedures to minimize systematic errors in a temperature measurement system.	*3*	*K3*	*CO1*
19.	Apply the zero-order transducer model in temperature measurement applications.	*3*	*K3*	*CO2*
20.	Examine the influence of time constant on the speed of response of first-order transducers.	*3*	*K4*	*CO2*
21.	Apply the characteristics of hot-wire anemometers in measuring turbulent airflow.	*3*	*K3*	*CO3*
22.	Apply variable reluctance transducers in vibration measurement systems and discuss their advantages.	*3*	*K3*	*CO4*
23.	Compare induction potentiometers and resistive potentiometers with respect to construction, sensitivity, and industrial applications.	*3*	*K4*	*CO4*
24.	Apply magneto elastic sensing principles in torque measurement applications and explain the associated signal conditioning techniques.	*3*	*K3*	*CO5*

PART - B (Descriptive Answer Questions)
(5 × 12 = 60 Marks)
Answer ALL Questions

25.	a)	Identify the various types of instrument errors and examine their causes and suitable remedies in measurement systems.	*12*	*K3*	*CO1*
		OR			
	b)	Apply the different characteristics of transducers to classify them for suitable engineering applications.	*12*	*K3*	*CO1*

26.	a)	Compare different transducers based on static characteristics such as sensitivity and linearity.	*12*	*K4*	*CO2*
		OR			
	b)	Analyze the stability of a transducer system using its mathematical model.	*12*	*K4*	*CO2*
27.	a)	Compare bonded and unbonded strain gauges with respect to construction, sensitivity, and practical applications.	*12*	*K4*	*CO3*
		OR			
	b)	Compare resistive and capacitive humidity sensors based on construction, sensitivity, accuracy, and applications.	*12*	*K4*	*CO3*
28.	a)	Explain the principle of operation and construction of an LVDT. Apply its characteristics for displacement measurement in industrial automation systems.	*12*	*K3*	*CO4*
		OR			
	b)	Apply the principle of capacitive pressure sensing in industrial process control systems.	*12*	*K3*	*CO4*
29.	a)	Apply fiber optic sensors in hazardous environment monitoring and discuss their advantages over conventional sensors.	*12*	*K3*	*CO5*
		OR			
	b)	Apply environmental monitoring sensors in smart city applications and explain the role of wireless sensing networks.	*12*	*K3*	*CO5*