Reg. No.															

Question Paper Code	13462

B.E. / B.Tech. - DEGREE EXAMINATIONS, APR / MAY 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.	Two equal resistances each of 100Ω±1% (standard deviation) are connected in parallel. The standard deviation of combination will be (a) 0.5% (b) 12% (c) 2% (d) 2	1	K3	CO1
2.	The limiting errors of measurements of power consumed by and the current passing through a resistance are ±1.5% and ±1%respectively.The limiting error for measurement of resistance will be then (a) ±0.5% (b) ±1.0% (c) ±2.5% (d) ±3.5%	1	K3	CO1
3.	The time taken by the output to fall from 90% to 10% of the final value is called (a) Rise time (b) delay time (c) storage time (d) Fall time	1	K2	CO2
4.	The voltage output of the thermocouple is (a) Directly proportional to the addition of temperature of hot junction and cold junction (b) Inversely proportional to the difference in temperature of hot junction and cold junction (c) Directly proportional to the difference of temperature of hot junction and cold junction (d) Inversely proportional to the addition in temperature of hot junction and cold junction	1	K2	CO2
5.	What does a decrease in electrical resistance signify in the functioning of a strain gauge? (a) The object is under compression (b) The object is being stretched (c) The object has reached its elastic limit (d) The object is experiencing no stress	1	K2	CO3
6.	Which of the following should be incorporated in the RTD to make a temperature sensing bridge most sensitive to temperature? (a) Platinum (b) Nickel (c) Thermistor (d) Copper	1	K2	CO3
7.	Composite capacitance consists of (a) One dielectric medium (b) More than one dielectric medium (c) Two dielectric media (d) Three dielectric media	1	K2	CO4
8.	Frequency response of capacitive transducers is (a) High (b) medium (c) Low (d) zero	1	K2	CO4
9.	Quartz and Rochelle salt belong to (a) natural group of piezoelectric materials (b) synthetic group of piezoelectric materials (c) natural or synthetic group of piezoelectric materials provided they are properly polarized (d) none of the mentioned	1	K2	CO5
10.	_____ Sensor is an integral element in the internet of things (IoT). (a) Smart Sensor (b) LASER Sensor (c) Nano Sensor (d) Acoustic Sensor	1	K2	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	Define Passive Transducer.	2	K1	CO1
12.	List the factors responsible for selection of a transducer.	2	K1	CO1

13.	Define Instrumental error.		*2*	*K1*	*CO1*
14.	List the test inputs of the transducer.		*2*	*K1*	*CO2*
15.	Compare accuracy and precision.		*2*	*K2*	*CO2*
16.	Define linearity.		*2*	*K1*	*CO2*
17.	Why dynamic compensation required for a hot wire anemometer?		*2*	*K1*	*CO3*
18.	Mention the different approximation methods of resistance thermometers.		*2*	*K1*	*CO3*
19.	Compare capacitive and inductive transducers.		*2*	*K2*	*CO4*
20.	Mention the need of a demodulator in a Variable Reluctance Accelerometer.		*2*	*K1*	*CO4*
21.	Identify the important features of smart transducer.		*2*	*K2*	*CO5*
22.	List the advantages of MEMS.		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Design a measurement system using appropriate functional blocks to determine the temperature of a flowing liquid in a pipe and draw a block diagrams.	*11*	*K3*	*CO1*
		OR			
	b)	The following values were obtained from the measurement of current: 12.35 A, 12.71 A, 12.48 A, 10.24 A, 12.63 A and 12.58 A. Calculate: 1. The arithmetic mean 2. The average deviation 3.The standard deviation.	*11*	*K3*	*CO1*
24.	a)	Obtain the ramp response of a first order instrument.	*11*	*K2*	*CO2*
		OR			
	b)	Discuss about the static characteristics.	*11*	*K2*	*CO2*
25.	a)	With a neat diagram explain the principle and construction details of linear and circular potentiometer.	*11*	*K2*	*CO3*
		OR			
	b)	Explain the construction and working of a hot wire anemometer with a neat diagram. Also give its advantages and disadvantages.	*11*	*K2*	*CO3*
26.	a)	Explain the construction and working principle of Synchros and Microsyn with neat diagram.	*11*	*K2*	*CO4*
		OR			
	b)	Discuss the frequency response of capacitive transducers.	*11*	*K2*	*CO4*
27.	a)	Describe the working of smart sensor with a neat block diagram.	*11*	*K2*	*CO5*
		OR			
	b)	Explain about the environmental Monitoring sensors in Water Quality & Air pollution in detail.	*11*	*K2*	*CO5*
28.	a) (i)	Describe the principle of operation of variable reluctance transducer.	*6*	*K2*	*CO4*
	(ii)	Explain the working principle of Film Sensor in detail.	*5*	*K2*	*CO5*
		OR			
	b) (i)	Describe the construction and working of a capacitor microphone.	*6*	*K2*	*CO4*
	(ii)	Explain the working principle of Nano Sensor in detail.	*5*	*K2*	*CO5*