Reg. No.															

Question Paper Code	13678

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Third Semester

Mechanical and Automation Engineering

20MUPW301 - SENSORS IN AUTOMATION

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is the difference between indicated value and true value of a quantity? (a) Gross Error (b) Absolute Error (c) Dynamic Error (d) Relative Error	1	K1	CO1
2.	Sensor provides output signal depending on _____. (a) Input (b) Physical quantity (c)Both a and b (d)None of the above	1	K1	CO1
3.	The principle of operation of LVDT is based on the vibration of _____. (a) Self-inductance (b) Mutual inductance (c) Reluctance (d) Permeance	1	K1	CO2
4.	Which of the following is used to transmit positional data electrically from one location to another? (a) Synchros (b) Microsyn (c) POT (d) PIR	1	K1	CO2
5.	Strain gauge works on the principle of what? (a) piezo-electric effect (b) barkhausen criterion (c) piezo- resistive effect (d) feedback element effect	1	K1	CO3
6.	What is the basic principle under which MEMS gyro work? (a) Angular momentum conservation (b) Mass conservation (c) Coriolis effect (d) Sagnag effect	1	K1	CO3
7.	Which one of the bridge is used to measure the change in resistance? (a) Anderson's bridge (b) Wheatstone's bridge (c) Hay's bridge (d) Maxwell's bridge	1	K1	CO4
8.	Which instruments are used for the measurement of pressure is / are _____. (a) Bellows (b) Diaphragms (c) All of the above (d) None of the mentioned	1	K1	CO4
9.	Choose the correct one of optical fiber sensors are electrically _____ (a) passive (b) active (c) active as well as passive (d) cannot be determined	1	K1	CO5
10.	Which type of sensor is commonly used to measure temperature in manufacturing processes? (a) Proximity sensor (b) Thermocouple (c) Pressure sensor (d) Light sensor	1	K1	CO6

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

		Marks	K – Level	CO
11.	What do you mean by a passive transducer?	2	K1	CO1
12.	List the various Dynamic characteristics.	2	K1	CO1
13.	What is the use of dielectric material in capacitive transducer?	2	K1	CO2
14.	Mention the types of segments used in GPS.	2	K1	CO2
15.	What are the different types of load cell?	2	K1	CO3
16.	Calculate the gauge factor of a strain gauge, if the value of resistance is 152 ohms, which changes by 5 ohms for 5000 micro strain.	2	K2	CO3
17.	What is self-heating error of thermometer?	2	K1	CO4
18.	Define tactile sensors.	2	K1	CO4
19.	Give any four applications of smart sensors.	2	K1	CO5

20.		What is LDR?	2	K1	CO5
21.		Define Data logging.	2	K1	CO6
22.		What are the sensors used and applications areas in Home appliance systems?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the following static characteristics. (a) Accuracy (b) Drift (c) Hysteresis (d) Sensitivity (e) static error (f) Repeatability.	11	K2	CO1
		OR			
	b) (i)	Enumerate the different types of errors in measurement.	5	K2	CO1
	(ii)	A circuit was tuned for resonance by eight different students and the values of resonant frequency in kHz were recorded as 532,548,543,535,546,531,543 and 536. Calculate (a) the arithmetic mean (b) deviations from mean (c) the average deviation and (d) the standard deviation.	6	K2	CO1
24.	a)	Explain the working principle of Potentiometer and its types. Also state its advantages, disadvantages and applications.	11	K2	CO2
		OR			
	b)	What is capacitive transducer? Explain its working principle with its advantages and disadvantages.	11	K2	CO2
25.	a)	Explain strain gauge load cell with its advantages and applications.	11	K2	CO3
		OR			
	b)	Summarize Anisotropic Magneto-Resistance effect with suitable example.	11	K2	CO3
26.	a)	Explain the working principle of pressure diaphragm and bellows with neat sketch.	11	K2	CO4
		OR			
	b)	Describe RTD sensor and explain how it can be used to measure temperature.	11	K2	CO4
27.	a)	Discuss the principle of operation of fiber optic sensor with neat diagram.	11	K2	CO5
		OR			
	b)	Illustrate with a neat sketch, the constructional and operation of smart sensor and outline its interface standard.	11	K2	CO5
28.	a)	Discuss the functions of Single Channel and Multi Channel Data Acquisition System with block diagram.	11	K2	CO6
		OR			
	b)	Demonstrate the importance, performance and applications of various sensors in Automobile industries.	11	K2	CO6