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**312302 - Basic Electrical & Electronics Engg
(BEE-Sem II)**

**As per MSBTE's K Scheme
CO / CM / IF / AI / AN / CW / DS**

Unit VI		Sensors and Transducers	Marks - 10
S. N.	MSBTE Board Asked Questions	Marks	
1.	<p>Which of the following is not a characteristic of an ideal transducer?</p> <p>a) High dynamic range b) Low linearity c) High repeatability d) Low noise</p> <p>Answer: b) Low linearity Explanation: An ideal transducer should show high linearity. A linear system should produce exact output according to input.</p>	1M	
2.	<p>Which of the following represent active transducer?</p> <p>a) Strain gauge b) Thermistor c) LVDT d) Thermocouple</p> <p>Answer: d) Thermocouple Explanation: Active transducers are self-generating type, they don't require external power to work while passive transducers require external power to work.</p>	1M	

<p>3.</p>	<p>Which transducer is known as 'self-generating transducer'?</p> <p>a) Active transducer b) Passive transducer c) Secondary transducer d) Analog transducer</p> <p>Answer: a) Active transducer</p> <p>Explanation: The name self-generating transducer is due to its property of working without the use of external power.</p>	<p>1M</p>
<p>4.</p>	<p>Which of the following is an analog transducer?</p> <p>a) Encoders b) Strain gauge c) Digital tachometers d) Limit switches</p> <p>Answer: b) Strain gauge</p> <p>Explanation: Analog transducers convert physical quantity to analog signals while digital transducers convert physical quantity to digital signals. Strain gauge is an example of an Analog transducer.</p>	<p>1M</p>
<p>5.</p>	<p>What is the principle of operation of LVDT?</p> <p>a) Mutual inductance b) Self-inductance c) Permanence d) Reluctance</p> <p>Answer: a) Mutual inductance</p> <p>Explanation: Linear variable differential transformer (LVDT) is a type of transformer used for measuring displacement, and it has the same principle of operation of transformer.</p>	<p>1M</p>

<p>6.</p>	<p>Which of the following can be measured using Piezo-electric transducer?</p> <p>a) Velocity b) Displacement c) Force d) Sound</p> <p>Answer: c) Force</p> <p>Explanation: Piezo-electric crystals produces an electric signal when pressure applied. Examples are quartz, Rochelle salt. That is, it converts force into electric signals.</p>	<p>1M</p>
<p>7.</p>	<p>Capacitive transducer is used for?</p> <p>a) Static measurement b) Dynamic measurement c) Transient measurement d) Both static and dynamic</p> <p>Answer: b) Dynamic measurement</p> <p>Explanation: Capacitive transducers convert measurant into changes in capacitance. Change in capacitance is caused by change in dielectric or change in distance between plates.</p>	<p>1M</p>
<p>8.</p>	<p>Which of the following is used in photo conductive cell?</p> <p>a) Selenium b) Quartz c) Rochelle salt d) Lithium sulphate</p> <p>Answer: a) Selenium</p> <p>Explanation: Photo conductive action is the property of reduction of resistance when exposed to light. Selenium shows photoconductive action.</p>	<p>1M</p>

<p>9.</p>	<p>What are transducers?</p> <p>a) They convert power from one form to another b) They convert work from one form to another c) They convert work to power d) They convert energy from one form to another</p> <p>Answer: d) They convert energy from one form to another</p> <p>Explanation: Transducer are devices that convert energy from one form to another. This energy can be either mechanical energy, light energy, heat energy or any other forms of energy.</p>	<p>1M</p>
<p>10.</p>	<p>Active transducer do not require any type of additional power source for an operation.</p> <p>a) True b) False</p> <p>Answer: a) True</p> <p>Explanation: Active transducers do not require any additional power source for converting the energy from one form to another as they work on the principle of energy conversion. One such example of active transducer is thermocouple.</p>	<p>1M</p>
<p>11.</p>	<p>What type of energy conversion does a piezoelectric transducer perform?</p> <p>a) It converts mechanical energy to sound energy b) It converts sound energy to mechanical energy c) It converts mechanical energy to electrical energy d) It converts electrical energy to mechanical energy</p> <p>Answer: c) It converts mechanical energy to electrical energy</p> <p>Explanation: A piezoelectric transducer converts mechanical energy to electrical energy. They are generally used to detect a knock or any impulsive force. They are also used in electronic drum pads to detect the impulse provided by the drumsticks.</p>	<p>1M</p>

12.	<p>The IC LM35 is used as which type of sensor?</p> <p>a) Pressure sensor b) Temperature sensor c) Light sensor d) Mechanical sensor</p> <p>Answer: b)) Temperature sensor</p> <p>Explanation: The LM35 IC manufactured by Texas Instruments is used as a temperature sensor. The output voltage generated by this IC is linearly proportional to the temperature in Centigrade. The output voltage is directly proportional to the temperature.</p>	1M
13.	<p>What is the range of frequency of the waves produced by the Ultrasonic transducer?</p> <p>a) 20 Kilohertz to several Gigahertz b) 1 Kilohertz to several Gigahertz c) 40 Kilohertz to several Megahertz d) less than 20 Kilohertz</p> <p>Answer: a) 20 Kilohertz to several Gigahertz</p> <p>Explanation: Ultrasonic transducers produce frequency ranging from 20 Kilohertz to several Gigahertz. Ultrasounds have a wide range of application in many fields, but majorly they are used for measuring the distance of objects.</p>	1M
14.	<p>What is the full form of LVDT with respect to displacement transducer?</p> <p>a) Linear variable differential temperature b) Linear variable differential transformer c) Liquid visible differential transformer d) Liquified visible differential transformer</p> <p>Answer: b) Linear variable differential transformer</p> <p>Explanation: LVDT stands for Linear variable differential transformer. It is a displacement transducer that converts</p>	1M

	<p>rectilinear motion to electric signals. They are used widely due to their robustness.</p>	
15.	<p>What is the effect on properties of LDR when light falls on it?</p> <p>a) Its resistance remains same b) Its resistance changes c) Its capacitance changes d) Its inductance changes</p> <p>Answer: b) Its resistance changes</p> <p>Explanation: When light falls on LDR (Light dependant resistor) its resistance changes. It is inversely proportional to the intensity of light. When light falls on LDR, the resistance decreases and more current starts to flow through it. It is used to measure the intensity of light.</p>	1M
16.	<p>What is measured by a hall effect transducer?</p> <p>a) Electric flux b) Electric Field c) Magnetic field d) Temperature</p> <p>Answer: c) Magnetic field</p> <p>Explanation: Hall effect transducers or Hall effect sensor is used for measuring the magnitude of the magnetic field. The output voltage produced by the sensor is directly proportional to the strength of the magnetic field passing through it.</p>	1M
17.	<p>Which of the following represents the application of inductive transducers?</p> <p>a) Displacement measurement b) Thickness measurement c) Both displacement and thickness measurement d) None of the mentioned</p> <p>Answer: c) Both displacement and thickness measurement</p> <p>Explanation: Inductive transducers can be used for measuring displacement and thickness of thin plate etc.</p>	1M

<p>18.</p>	<p>Inductive potentiometers are used to measure _____</p> <p>a) Voltage b) Current c) Displacement d) None of the mentioned</p> <p>Answer: c) Displacement</p> <p>Explanation: It has same function as linear potentiometers and is used for measuring displacement.</p>	<p>1M</p>
<p>19.</p>	<p>Capacitive transducers can be used by _____</p> <p>a) Measuring change in distance between plates b) Measuring change in area of plates c) Change in a dielectric material d) All of the mentioned</p> <p>Answer: d) All of the mentioned</p> <p>Explanation: Capacitance of a material is affected by area and distance of separation of plates and dielectric material.</p>	<p>1M</p>
<p>20.</p>	<p>Capacitive transducers cannot be used as strain gauges.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Strain to be measured is applied to parallel plates of a capacitor and total displacement change will be proportional to strain.</p>	<p>1M</p>
<p>21.</p>	<p>Which of the following is correct for the capacitive transducer?</p> <p>a) Capacitive strain gauges b) Capacitive tachometers c) Capacitive pressure transducer d) All of the mentioned</p> <p>Answer: d) All of the mentioned</p> <p>Explanation: Capacitive transducers find application in</p>	<p>1M</p>

	<p>measurement of both strain, pressure and angular displacement. Hence all of the mentioned can be treated as application of capacitive transducer.</p>	
22.	<p>For a material capacitance increases with _____</p> <p>a) Decrease in area of plates, all other factors constant</p> <p>b) Increase in distance between plates, all other factors constant</p> <p>c) Decrease in distance between plates, all other factors constant</p> <p>d) None of the mentioned</p> <p>Answer: c) Decrease in distance between plates, all other factors constant</p> <p>Explanation: Capacitance can be represented as $C = \epsilon_0 \epsilon_r A / d$</p> <p>Where,</p> <p>$\epsilon_r$ represents dielectric constant</p> <p>A is the area of plate</p> <p>d is the distance between plates.</p>	1M
23.	<p>Which of the following quantities cannot be measured by capacitive transducers?</p> <p>a) Displacement</p> <p>b) Speed</p> <p>c) Moisture</p> <p>d) None of the mentioned</p> <p>Answer: d) None of the mentioned</p> <p>Explanation: Capacitive transducer finds application in measuring almost all quantities like displacement, thickness, moisture speed etc.</p>	1M

24.	<p>Thermometers are not possible using a capacitive transducer.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Capacitive transducers can be used to measure temperature in a way similar to moisture measurement.</p>	1M
25.	<p>Who invented the piezoelectric effect?</p> <p>a) Mary Elizabeth Barber b) Christian Doppler c) Marie curie and Pierre curie d) Pierre curie and Jacques curie</p> <p>Answer: d) Pierre curie and Jacques curie</p> <p>Explanation: Piezoelectric effect was first invented and explained by curie brothers, Pierre curie and Jacques curie in 1980.</p>	1M
26.	<p>Which of the following represents piezoelectric materials?</p> <p>a) ADP b) Quartz c) Bernilite d) All of the mentioned</p> <p>Answer: d) All of the mentioned</p> <p>Explanation: Quartz, ADP (Ammonium dihydrogen Phosphate), and bernilite are examples of piezoelectric materials.</p>	1M
27.	<p>Which of the following quantities cannot be measured using piezoelectric transducers?</p> <p>a) Pressure b) Strain c) Acceleration d) None of the mentioned</p>	1M

	<p>Answer: d) None of the mentioned</p> <p>Explanation: Piezoelectric transducers can be used to measure a wide range of quantities like pressure, acceleration, strain displacement etc.</p>	
28.	<p>In piezoelectric strain transducer voltage developed is _____ to strain applied.</p> <p>a) Directly proportional b) Inversely proportional c) Equal d) Independent</p> <p>Answer: a) Directly proportional</p> <p>Explanation: For a piezoelectric strain transducer, as the strain applied increases output voltage also increases.</p>	1M
29.	<p>Photoelectric devices are sensitive to all wavelength.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Photoelectric devices are sensitive to certain wavelength only hence they should be calibrated before every use.</p>	1M
30.	<p>In photo emissive transducers, electrons are attracted by _____</p> <p>a) Cathode b) Anode c) Grid d) Body</p> <p>Answer: b) Anode</p> <p>Explanation: In photo emissive transducers, electrons emitted by the cathode are attracted by anode plates.</p>	1M
31.	<p>The quantity to be measured by an instrumentation system is</p>	

	<p>a) Measurement b) Measurand c) Signal</p> <p>Answer: b) Measurand</p> <p>Explanation: The quantities that can be measured are called as physical quantity or measurand.</p>	
32.	<p>LVDT is a _____</p> <p>a) Active b) Passive c) Hybrid</p> <p>Answer: b) Passive</p> <p>Explanation: A passive transducer is an externally powered transducer. This device cannot convert a physical signal into an electrical signal on its own to another energy source, the passive element. When connected, it transforms the motion by the fluctuations generated from the power source.</p>	1M
33.	<p>Which of the following materials can be used as photoconductive transducer?</p> <p>a) Selenium b) Silicon c) Germanium d) All of the mentioned</p> <p>Answer: d) All of the mentioned</p> <p>Explanation: Photoconductive cells are materials which changes conductivity on the application of light.</p>	1M
34.	<p>Semiconductor layer using silicon and germanium is known as _____</p> <p>a) Photo diodes b) Photo junction diodes c) Photo material</p>	1M

	<p>d) Photo sensitive materials</p> <p>Answer: b) Photo junction diodes</p> <p>Explanation: Photo junction diodes are semiconductor layers formed by silicon and germanium which are used in photovoltaic cells.</p>	
35.	<p>Which of the following are used to form photo transistors?</p> <p>a) Two photo diodes</p> <p>b) Three photo diodes</p> <p>c) Normal diodes</p> <p>d) None of the mentioned</p> <p>Answer: a) Two photo diodes</p> <p>Explanation: Photo transistors are formed by placing two photo diodes back to back.</p>	1M
36.	<p>Thermocouple is a _____</p> <p>a) Primary device</p> <p>b) Secondary transducer</p> <p>c) Tertiary transducer</p> <p>d) None of the mentioned</p> <p>Answer: a) Primary device</p> <p>Explanation: Thermocouple is a device which converts thermal energy to electrical energy and it can be treated as a primary device.</p>	1M
37.	<p>Operation of thermocouple is governed by _____</p> <p>a) Peltier effect</p> <p>b) Seebeck effect</p> <p>c) Thomson effect</p> <p>d) All of the mentioned</p> <p>Answer: d) All of the mentioned</p> <p>Explanation: Operation of thermocouple is based on three major effects- Peltier, Thomson and seebeck, all describe the relation between current flow and temperature between two</p>	1M

	different metal.	
38.	<p>Thermocouple cannot used for measurement of temperature of liquid.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Immersion type thermocouple can be used to measure temperature of liquid, in which thermocouple is immersed in liquid.</p>	1M
39.	<p>Active transducers are classified into _____</p> <p>a) 4 types b) 2 types c) 6 types d) 8 types</p> <p>Answer: a) 4 types</p> <p>Explanation: Active transducers can be subdivided into four types. They are as follows:</p> <ul style="list-style-type: none"> • Photovoltaic • Thermoelectric • Piezoelectric • Electromagnetic. 	1M
40.	<p>Active transducers develops _____</p> <p>a) mechanical parameter b) electrical parameter c) chemical parameter d) physical parameter</p> <p>Answer: b) electrical parameter</p> <p>Explanation: Active transducers are also known as self-generating type of transducers. They develop an electrical voltage or current proportional to the quantity being measured.</p>	1M

41.	<p>How do passive transducers develop electrical signals?</p> <p>a) using a transformer b) using internal source c) using external source d) using a diode</p> <p>Answer: c) using external source</p> <p>Explanation: Passive transducers develop electrical signals by means of an external source. They are usually known as externally power driven sources.</p>	1M
42.	<p>Capacitive transduction involves _____</p> <p>a) change in resistance b) change in inductance c) change in resistance d) change in capacitance</p> <p>Answer: d) change in capacitance</p> <p>Explanation: In capacitive transduction, measurand involves the change in the capacitance. Capacitance changes when the distance between the plates is varied or by a change in the dielectric.</p>	1M
43.	<p>In electromagnetic based transduction measurand is _____</p> <p>a) converted into mechanical force b) converted into electromotive force c) converted into chemical force d) converted into physical force</p> <p>Answer: b) converted into electromotive force</p> <p>Explanation: Electromagnetic transduction involves the conversion of the measurand into electromotive force. Magnetic flux is produced as a result of the relative motion between the magnet and an electromagnet.</p>	1M
44.	<p>Inductive transduction involves _____</p> <p>a) change in self-inductance</p>	1M

	<p>b) change in capacitance c) change in mutual inductance d) change in resistance</p> <p>Answer: a) change in self-inductance Explanation: In an inductive transduction based system, measurand involves change in the self-inductance of the coil.</p>	
45.	<p>Photovoltaic transduction involves _____</p> <p>a) voltage generation heat b) voltage generation through sound c) voltage generation through light d) voltage generation current</p> <p>Answer: c) voltage generation through light Explanation: In a photovoltaic transduction based system, measurand is converted into voltage when the junction between dissimilar elements is illuminated.</p>	1M
46.	<p>Analog transducers convert input into _____</p> <p>a) voltage b) current c) digital d) analog</p> <p>Answer: d) analog Explanation: The analog transducers convert input into analog signal. The output is a continuous function of time. Strain gauge, LVDT, thermistor etc are analog transducers as they produce outputs which are a continuous function of time.</p>	1M
47.	<p>Inverse transducer converts electrical into a physical quantity.</p> <p>a) True b) False</p> <p>Answer: a) True</p>	1M

	<p>Explanation: An inverse transducer is used to convert an electrical quantity into a physical quantity. For example, loudspeaker converts electrical signal into sound signal.</p>	
48.	<p>Digital transducers produce analog output.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Digital transducers produce digital output in response to an input signal. A unique code is generated for each discrete value sensed.</p>	1M
49.	<p>Selection of a transducer depends on the quantity being measured.</p> <p>a) True b) False</p> <p>Answer: a) True</p> <p>Explanation: A transducer is selected based on the nature of the quantity that is being measured. For example temperature measurement involves the use of temperature sensors whereas measurement of stress involves a strain gauge.</p>	1M
50.	<p>Transducers must operate under _____</p> <p>a) zero electromagnetic field b) constant electromagnetic fields c) varying electromagnetic fields d) infinite electromagnetic field</p> <p>Answer: c) varying electromagnetic fields</p> <p>Explanation: A transducer should operate under strong electromagnetic fields. Generally transducers with a low value of output impedance, high value of output voltage and shorter cable length are not susceptible to such interference.</p>	1M

5.1	<p>How many passive transducers are there?</p> <p>a) 1 b) 3 c) 5 d) 7</p> <p>Answer: b) 3</p> <p>Explanation: There are three passive transducers. They are as follows:</p> <p>Resistor Capacitor Inductor.</p>	1M
52.	<p>Smallest change which a sensor can detect is _____</p> <p>a) Resolution b) Accuracy c) Precision d) Scale</p> <p>Answer: a) Resolution</p> <p>Explanation: Resolution is the smallest change a sensor can detect.</p>	1M
	<p>Thermocouple generate output voltage according to _____</p> <p>a) Circuit parameters b) Humidity c) Temperature d) Voltage</p> <p>Answer: c) Temperature</p> <p>Explanation: Thermocouple is a device which is capable of producing output voltage according to input temperature.</p>	1M

53.	<p>Sensor is a type of transducer.</p> <p>a) True b) False</p> <p>Answer: a) True</p> <p>Explanation: Sensor is a device which enables measurement of input value.</p>	1M
54.	<p>Which of the following is not an analog sensor?</p> <p>a) Potentiometer b) Force-sensing resistors c) Accelerometers d) None of the mentioned</p> <p>Answer: d) None of the mentioned</p> <p>Explanation: All of the mentioned devices are analog sensors.</p>	1M
55.	<p>A _____ is thermally sensitive resistor that exhibits a large change in resistance.</p> <p>a) Thermistor b) Resistance Thermometer c) Thermo couple d) Semiconductor based sensor</p> <p>Answer: a) Thermistor</p> <p>Explanation: A thermistor is a thermally sensitive resistor that exhibits a large, predictable, and precise change in resistance correlated to variations in temperature.</p>	1M
56.	<p>_____ measures temperature by correlating the resistance of the RTD with temperature.</p> <p>a) Thermistor b) Resistance Thermometer c) Thermo couple d) Semiconductor based sensor</p> <p>Answer: b) Resistance Thermometer</p> <p>Explanation: A Resistance Thermometer measures</p>	1M

	<p>temperature by correlating the resistance of the RTD with temperature. An RTD consists of a film or, for greater accuracy, a wire wrapped around a ceramic or glass core.</p>	
57.	<p>_____ consists of two different metals connected at two points.</p> <p>a) Thermistor b) Resistance Thermometer c) Thermocouple d) Semiconductor based sensor</p> <p>Answer: c) Thermocouple</p> <p>Explanation: Thermocouple consists of two different metals connected at two points. The varying voltage between these two points reflects proportional changes in temperature.</p>	1M
58.	<p>Which type of temperature sensor is placed in Integrated Circuits?</p> <p>a) Thermistor b) Resistance Thermometer c) Thermocouple d) Semiconductor based sensor</p> <p>Answer: d) Semiconductor based sensor</p> <p>Explanation: A semiconductor based temperature sensor is placed on Integrated Circuits. They are linear but have the lowest accuracy.</p>	1M
59.	<p>Which sensor is linear and low accuracy?</p> <p>a) Thermistor b) Resistance Thermometer c) Thermocouple d) Semiconductor based sensor</p> <p>Answer: d) Semiconductor based sensor</p> <p>Explanation: A semiconductor based temperature sensor is placed on Integrated Circuits. They are linear but have the lowest accuracy.</p>	1M

60.	<p>Inverse transducers are also known as _____</p> <p>a) Open loop transducers b) Closed loop transducers c) Input transducers d) Output transducers</p> <p>Answer: d) Output transducers</p> <p>Explanation: Output transducers are which converts electrical quantity to non-electrical quantity, known as inverse transducers.</p>	1M
61.	<p>Inverse transducer is system which converts _____</p> <p>a) Electrical quantity to non-electrical quantity b) Non-electrical quantity to electrical quantity c) Electrical quantity to electrical quantity itself d) Non- electrical quantity to non-electrical quantity itself</p> <p>Answer: a) Electrical quantity to non-electrical quantity</p> <p>Explanation: Transducers are devices which transfers measurand which will be a non-electrical quantity to electrical quantity. Inverse transducers are the devices operating just opposite to transducers.</p>	1M
62.	<p>Which of the following is an inverse transducer _____</p> <p>a) Piezoelectric transducer b) LVDT c) Load cell d) Bourdon tube</p> <p>Answer: a) Piezoelectric transducer</p> <p>Explanation: Piezo electric transducers are devices which are capable of converting electrical quantity to non-electrical quantity, which is an inverse transducer.</p>	1M

63	<p>Input transducers and inverse transducers are the same.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Input transducers are devices which convert non-electrical quantity to electrical quantity and Inverse transducers are devices which convert electrical quantity to non-electrical quantity.</p>	1M
64	<p>Which of the following cannot act as inverse transducer?</p> <p>a) Quartz b) Barium titanate c) Lead zirconate d) Cadmium</p> <p>Answer: d) Cadmium</p> <p>Explanation: Quartz, Barium titanate and Lead zirconate are piezo electrical substances which are known for its ability to act as inverse transducers.</p>	1M
65	<p>Which type of transducer requires energy to be put into it in order to translate changes due to the measurand?</p> <p>a) active transducers b) passive transducers c) powered transducers d) local transducers</p> <p>Answer: b) passive transducers</p> <p>Explanation: Passive transducers are transducers that require energy to translate changes due to the measurand. Active transducers convert one form of energy directly into another. For example photovoltaic cell in which light energy is converted into electrical energy.</p>	1M

<p>66</p>	<p>Active transducers work on the principle of _____</p> <p>a) energy conversion b) mass conversion c) energy alteration d) volume conversion</p> <p>Answer: a) energy conversion</p> <p>Explanation: Active transducers work on the principle of energy conversion. They convert one form of energy to another. They don't require any power to operate.</p>	<p>1M</p>
<p>67</p>	<p>Accuracy is _____</p> <p>a) ability of the transducer or sensor to see small differences in reading b) ability of the transducer or sensor to see small differences in reading c) algebraic difference between the indicated value and the true or theoretical value of the measurand d) total operating range of the transducer</p> <p>Answer: c) algebraic difference between the indicated value and the true or theoretical value of the measurand</p> <p>Explanation: Accuracy describes the algebraic difference between the indicated value and the true or theoretical value of the measurand. Resolution is the ability of the transducer or sensor to see small differences in reading. Precision refers to the degree of repeatability of a measurand.</p>	<p>1M</p>
<p>67</p>	<p>The smallest change in measurand that will result in a measurable change in the transducer output is called _____</p> <p>a) offset b) linearity c) resolution d) threshold</p>	

	<p>Answer: d) threshold</p> <p>Explanation: The threshold of the transducer is the smallest change in measurant that will result in a measurable change in the transducer output. Offset is the output that will exist when it should be zero. Linearity shows closeness of a transducer's calibration curve to a specific straight line with in a given percentage of full scale output.</p>	
68	<p>Unwanted signal at the output due either to internal sources or to interference is called _____</p> <p>a) offset b) noise c) drift d) threshold</p> <p>Answer: b) noise</p> <p>Explanation: Noise is the unwanted signal at the output due either to internal sources or to interference. Offset is the output that will exist when it should be zero. The threshold of the transducer is the smallest change in measurant that will result in a measurable change in the transducer output.</p>	1M
69	<p>The ability of the sensor to see small differences in reading is called _____</p> <p>a) resolution b) drift c) offset d) linearity</p> <p>Answer: a) resolution</p> <p>Explanation: The ability of the sensor to see small differences in reading is called the resolution of the sensor. Offset is the output that will exist when it should be zero. Linearity shows closeness os a transducer's calibration curve to a specific straight line with in a given percentage of full scale output.</p>	1M

<p>70</p>	<p>Linearity of transducer is _____</p> <p>a) Closeness of the transducer's calibration curve to a special curved line within a given percentage of full scale output</p> <p>b) Closeness of the transducer's calibration curve to a special straight line within a given percentage of full scale output</p> <p>c) Closeness of the transducer's calibration curve to a special straight line within a given percentage of half scale output</p> <p>d) Closeness of the transducer's calibration curve to a special curved within a given percentage of half scale output</p> <p>Answer: b) Closeness of the transducer's calibration curve to a special straight line within a given percentage of full scale output</p> <p>Explanation: Linearity of transducer is closeness of the transducer's calibration curve to a special straight line within a given percentage of full scale output. Basically, it reflects that the output is in some way proportional to the input. A linear sensor produces an output value which is directly proportional to the input.</p>	<p>1M</p>
<p>70</p>	<p>What is the principle behind photoelectric transducers?</p> <p>a) Conversion of wind energy to electrical energy</p> <p>b) conversion of light energy to electrical energy</p> <p>c) conversion of mechanical energy to electrical energy</p> <p>d) conversion of electrical energy to light energy</p> <p>Answer: b) conversion of light energy to electrical energy</p> <p>Explanation: Photoelectric transducers are based on the principle of conversion of light energy into electrical energy. This is done by causing the radiation to fall on a photosensitive element and measuring the electrical current so generated with a sensitive galvanometer directly or after suitable amplification.</p>	<p>1M</p>

71	<p>Which of the following material is used to build photovoltaic cells?</p> <p>a) Selenium b) celenuim c) silicon d) iron</p> <p>Answer: a) selenium</p> <p>Explanation: Photovoltaic or barrier layer cells usually consist of a semiconducting substance, which is generally selenium deposited on a metal base which may be iron and which acts as one of the electrodes. The semiconducting substance is covered with a thin layer of silver or gold deposited by cathodic deposition in a vacuum. This layer acts as a collecting electrode.</p>	1M
78	<p>Photo-diodes work in _____</p> <p>a) forward biased b) reverse biased c) independent of forward and reverse biasing d) any configuration</p> <p>Answer: b) reverse biased</p> <p>Explanation: The photodiode is a P-N junction semiconductor diode. It always operated in the reversed biased condition. The light is always focused through a glass lens on the junction of the photo diode.</p>	1M
79	<p>Photovoltaic cells need an external electrical supply to function.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: Photovoltaic cells are very robust in construction, need no external electrical supply and produce a</p>	1M

	<p>photocurrent sometimes stronger than other photosensitive elements. Typical photocurrents produced by these cells are as high as 120 mA/lumen. At constant temperature, the current set up in the cell usually shows a linear relationship with the incident light intensity.</p>	
80	<p>Thermistor is used to measure _____</p> <p>a) temperature b) pressure c) height d) displacement</p> <p>Answer: a) temperature</p> <p>Explanation: Thermistor is used to measure temperature. It is a temperature transducer. With a change in temperature its resistance changes. Thus its working principle is variable resistance. Thermistors are the oxides of certain metals like manganese, cobalt and nickel which have large negative temperature coefficient, i.e. resistance decreases with increase in temperature.</p>	1M
81	<p>Inverse transducers are also known as _____</p> <p>a) Open loop transducers b) Closed loop transducers c) Input transducers d) Output transducers</p> <p>Answer: d) Output transducers</p> <p>Explanation: Output transducers are which converts electrical quantity to non-electrical quantity, known as inverse transducers.</p>	1M
82	<p>Inverse transducer is system which converts _____</p> <p>a) Electrical quantity to non-electrical quantity b) Non-electrical quantity to electrical quantity c) Electrical quantity to electrical quantity itself d) Non- electrical quantity to non-electrical quantity itself</p>	1M

	<p>Answer: a) Electrical quantity to non-electrical quantity</p> <p>Explanation: Transducers are devices which transfers measurand which will be a non-electrical quantity to electrical quantity. Inverse transducers are the devices operating just opposite to transducers.</p>	
83	<p>Which of the following is an inverse transducer _____</p> <p>a) Piezoelectric transducer</p> <p>b) LVDT</p> <p>c) Load cell</p> <p>d) Bourdon tube</p> <p>Answer: a) Piezoelectric transducer</p> <p>Explanation: Piezo electric transducers are devices which are capable of converting electrical quantity to non-electrical quantity, which is an inverse transducer.</p>	1M
84	<p>Input transducers and inverse transducers are the same.</p> <p>a) True</p> <p>b) False</p> <p>Answer: b) False</p> <p>Explanation: Input transducers are devices which convert non-electrical quantity to electrical quantity and Inverse transducers are devices which convert electrical quantity to non-electrical quantity.</p>	1M
85	<p>Which of the following cannot act as inverse transducer?</p> <p>a) Quartz</p> <p>b) Barium titanate</p> <p>c) Lead zirconate</p> <p>d) Cadmium</p> <p>Answer: d) Cadmium</p> <p>Explanation: Quartz, Barium titanate and Lead zirconate are piezo electrical substances which are known for its ability to act as inverse transducers.</p>	1M

86	<p>Which of the following has the widest range of temperature measurement?</p> <p>a) RTD b) Thermocouple c) Thermistor d) Mercury thermometer</p> <p>Answer: b) Thermocouple</p> <p>Explanation: Thermocouple has the widest range of temperature measurement from -184°C to +2300°C. RTD has a range of -200°C to +850°C. Thermistor has a range of 0°C to 100°C where as conventional mercury thermometers range is -37°C to +356°C.</p>	1M
87	<p>The junction at a higher temperature in thermocouple is termed as measuring junction.</p> <p>a) True b) False</p> <p>Answer: a) True</p> <p>Explanation: The junction at a higher temperature in thermocouple is termed as measuring junction. The junction at lower temperature in the thermocouple is called the reference temperature. The cold junction is usually kept at 0°C.</p>	1M
88	<p>When two wires of different material are joined together at either end, forming two junctions which are maintained at a different temperature, a _____ force is generated.</p> <p>a) thermo-motive b) electro-motive c) chemical reactive d) mechanical</p>	1M

	<p>Answer: a) thermo-motive</p> <p>Explanation: When two wires of different material are joined together at either end, forming two junctions which are maintained at a different temperature, a thermo-motive force is generated causing a current to flow around the circuit. This arrangement is called thermocouple. The junction at higher temperature in thermocouple is termed as measuring junction. The junction at lower temperature in the thermocouple is called the reference temperature.</p>	
89	<p>The junction at a lower temperature in the thermocouple called measuring junction.</p> <p>a) True b) False</p> <p>Answer: b) False</p> <p>Explanation: The junction at a lower temperature in the thermocouple is called the reference temperature. The cold junction is usually kept at 0°C. The junction at a higher temperature in thermocouple is termed as measuring junction.</p>	1M
90	<p>The lower temperature junction in thermocouple is maintained at _____</p> <p>a) -273 K b) 0 K c) -327 K d) 273 K</p> <p>Answer: d) 273 K</p> <p>Explanation: The lower temperature junction in thermocouple is maintained at 273 K (0°C). The junction at lower temperature in the thermocouple is called the reference temperature. The junction at higher temperature in thermocouple is termed as measuring junction.</p>	1M

<p>91</p>	<p>RTD stands for _____</p> <p>a) resistance temperature device b) resistance temperature detector c) reluctance thermal device d) resistive thermal detector</p> <p>Answer: b) resistance temperature detector</p> <p>Explanation: RTD stands for Resistance Temperature Device. It is a passive sensor and requires current excitation to produce an output voltage. RTD has very low temperature coefficient. Voltage drop across RTD is much larger than thermocouple output voltage.</p>	<p>1M</p>
<p>92</p>	<p>Thermister is used to measure _____</p> <p>a) temperature b) pressure c) height d) displacement</p> <p>Answer: a) temperature</p> <p>Explanation: Thermistor is used to measure temperature. It is a temperature transducer. With a change in temperature its resistance changes. Thus its working principle is variable resistance. Thermistors are the oxides of certain metals like manganese, cobalt and nickel which have large negative temperature coefficient, i.e. resistance decreases with increase in temperature.</p>	<p>1M</p>
<p>93</p>	<p>What is the principle of operation of LVDT?</p> <p>a) Mutual inductance b) Self-inductance c) Permanence d) Reluctance</p> <p>Answer: a) Mutual inductance</p> <p>Explanation: Linear variable differential transformer (LVDT) is a type of transformer used for measuring displacement, and it has the same principle of operation of transformer.</p>	<p>1M</p>

<p style="text-align: center;">94</p>	<p>Which of the following can be measured using Piezo-electric transducer?</p> <ul style="list-style-type: none"> a) Velocity b) Displacement c) Force d) Sound <p>Answer: c) Force</p> <p>Explanation: Piezo-electric crystals produces an electric signal when pressure applied. Examples are quartz, Rochelle salt. That is, it converts force into electric signals.</p>	<p style="text-align: center;">1M</p>
<p style="text-align: center;">95</p>	<p>Capacitive transducer is used for?</p> <ul style="list-style-type: none"> a) Static measurement b) Dynamic measurement c) Transient measurement d) Both static and dynamic <p>Answer: b) Dynamic measurement</p> <p>Explanation: Capacitive transducers convert measurant into changes in capacitance. Change in capacitance is caused by change in dielectric or change in distance between plates.</p>	<p style="text-align: center;">1M</p>
<p style="text-align: center;">96</p>	<p>Which of the following is used in photo conductive cell?</p> <ul style="list-style-type: none"> a) Selenium b) Quartz c) Rochelle salt d) Lithium sulphate <p>Answer: a) Selenium</p> <p>Explanation: Photo conductive action is the property of reduction of resistance when exposed to light. Selenium shows photoconductive action.</p>	<p style="text-align: center;">1M</p>

<p>97</p>	<p>What are transducers?</p> <p>a) They convert power from one form to another b) They convert work from one form to another c) They convert work to power d) They convert energy from one form to another</p> <p>Answer: d) They convert energy from one form to another</p> <p>Explanation: Transducer are devices that convert energy from one form to another. This energy can be either mechanical energy, light energy, heat energy or any other forms of energy.</p>	<p>1M</p>
<p>98</p>	<p>Active transducer do not require any type of additional power source for an operation.</p> <p>a) True b) False</p> <p>Answer: a) True</p> <p>Explanation: Active transducers do not require any additional power source for converting the energy from one form to another as they work on the principle of energy conversion. One such example of active transducer is thermocouple.</p>	<p>1M</p>
<p>99</p>	<p>What type of energy conversion does a piezoelectric transducer perform?</p> <p>a) It converts mechanical energy to sound energy b) It converts sound energy to mechanical energy c) It converts mechanical energy to electrical energy d) It converts electrical energy to mechanical energy</p> <p>Answer: c) It converts mechanical energy to electrical energy</p> <p>Explanation: A piezoelectric transducer converts mechanical energy to electrical energy. They are generally used to detect a knock or any impulsive force. They are also used in electronic drum pads to detect the impulse provided by the drumsticks.</p>	<p>1M</p>

<p>100</p>	<p>The IC LM35 is used as which type of sensor?</p> <ul style="list-style-type: none">a) Pressure sensorb) Temperature sensorc) Light sensord) Mechanical sensor <p>Answer: b) Temperature sensor</p> <p>Explanation: The LM35 IC manufactured by Texas Instruments is used as a temperature sensor. The output voltage generated by this IC is linearly proportional to the temperature in Centigrade. The output voltage is directly proportional to the temperature.</p>	<p>1M</p>
<p>101</p>	<p>What is the full form of LVDT with respect to displacement transducer?</p> <ul style="list-style-type: none">a) Linear variable differential temperatureb) Linear variable differential transformerc) Liquid visible differential transformerd) Liquified visible differential transformer <p>Answer: b)Linear variable differential transformer</p> <p>Explanation: LVDT stands for Linear variable differential transformer. It is a displacement transducer that converts rectilinear motion to electric signals. They are used widely due to their robustness.</p>	<p>1M</p>

102	<p>What is the effect on properties of LDR when light falls on it?</p> <p>a) Its resistance remains same b) Its resistance changes c) Its capacitance changes d) Its inductance changes</p> <p>Answer: b) Its resistance changes</p> <p>Explanation: When light falls on LDR (Light dependent resistor) its resistance changes. It is inversely proportional to the intensity of light. When light falls on LDR, the resistance decreases and more current starts to flow through it. It is used to measure the intensity of light.</p>	1M
103	<p>What is measured by a hall effect transducer?</p> <p>a) Electric flux b) Electric Field c) Magnetic field d) Temperature</p> <p>Answer: c) Magnetic field</p> <p>Explanation: Hall effect transducers or Hall effect sensor is used for measuring the magnitude of the magnetic field. The output voltage produced by the sensor is directly proportional to the strength of the magnetic field passing through it.</p>	1M

Thank You

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