UNIT-1

Q1.What is meant by measurement?
Ans.Measurement is an act or the result of comparison between the quantity and a predefined standard.

Q2. Mention the basic requirements of measurement?
Ans.The standard used for comparison purpose must be accurately defined and should be commonly accepted. The apparatus used and the method adopted must be provable.

Q3.What are the 2 methods for measurement?
Ans.Direct method and Indirect method.

Q4. Explain the function of measurement system?
Ans.The measurement system consists of a transducing element which converts the quantity to be measured in an analogous form. The analogous signal is then processed by some intermediate means and is then fed to the end device which presents the results of the measurement.

Q5.Define Instrument?
Ans.Instrument is defined as a device for determining the value or magnitude of a quantity or variable.

Q6. List the types of instruments
Ans.The 3 types of instruments are Mechanical Instruments , Electrical Instruments and Electronic Instruments.

Q7. Classify instruments based on their functions.
Ans.Indicating instruments ,Integrating instruments & Recording instruments

Q8. Give the applications of measurement systems.
Ans.The instruments and measurement systems are sued for Monitoring of processes and operations. Control of processes and operations. Experimental engineering analysis.

Q9. Define static characteristics?
Ans.Static characteristics are the set of rules or criteria that is defined for those instruments that varies very slowly with time or remains a constant.

Q10. Define Dynamic characteristics?
Ans.Dynamic characteristics are the set of rules or criteria that is defined for those instruments that varies very rapidly with time.

Q11. What are the various Dynamic characteristics?
Ans.Various Dynamic characteristics are Fiedality ,Speed of Response ,Time Delay, Lag, Dynamic error

Q12. What are the various Static characteristics?
Ans.Various Static characteristics are Accuracy, Precision, Error ,Threshold ,Bias, Linearity Stability ,Reproducibility ,Hysterisis Range ,Dead Space ,Sensitivity.

Q13. What are the various units of measurements? Various units of measurements are Ans. Fundamental Units e.g.: Length (m), Mass (kg), and time (S) Supplementary Units & Derived Units.

UNIT-2

Q1.What is the function of detector and loud speaker in a radio receiver?
Ans:- Detector or demodulator separates AF Signal from the carrier and loud speaker converts amplified AF signal into sound (information) energy.

Q.2 What is the carrier frequency of i) AM ii) FM radio transmitter?
Ans: AM radio stations have carrier frequencies from about 530 to 1600 kHz, AM radio stations have much carrier frequencies, between 88 to 108 MHz.

Q3.What is Transducer?
Ans. Transducer is a device that converts information energy to be transmitted into electrical signal

Q4.The resistance of LDR _____ when exposed to radiant energy.
a) Remains unaltered
b) Decreases
c) Reaches maximum

Q5.The transducers that converts the input signal into the output signal, which is a discrete function of time is known as _____ transducer.
a) Digital
b) Analog
c) Active
d) Pulse

Ans : (a)

Q6. A transducer that converts measurand into the form of pulse is called
a) Active transducer
b) Analog transducer
c) Digital transducer
d) Pulse transducer

Ans : (d)

Q7. Which of the following is a digital transducer?
a) Strain gauge
b) Encoder
c) Thermistor
d) LVDT

Ans : (b)

Q8. Strain gauge, LVDT and thermocouple are examples of
a) Active transducers
b) Passive transducers
c) Analog transducers
d) Primary transducers

Ans : (c)

Q7. An inverse transducer is a device which converts
a) Mechanical quantity to Electrical quantity
b) Electrical quantity into mechanical quantity
c) Electrical energy into thermal energy
d) An electrical quantity into a non electrical quantity

Ans : (d)

Q8. A strain gauge is a passive transducer and is employed for converting
a) Mechanical displacement into a change of resistance
b) Pressure into a change of resistance
c) Force into a displacement
d) Pressure into displacement

Ans : (a)

Q9. Resolution of a transducer depends on
a) Material of wire
b) Length of wire
c) Diameter of wire
d) Excitation voltage

Ans : (c)

Q10.The sensitivity factor of strain gauge is normally of the order of
a) 1 to 1.5
b) 5 to 10
c) 0.5 to 1.0
d) 1.5 to 2.0

Ans : (d)

Q11. In wire wound strain gauges, the change in resistance is due to
a) Change in diameter of the wire
b) Change in length of the wire
c) Change in both length and diameter
d) Change in resistivity

Ans : (c)

Q12. Bonded wire strain gauges are
a) Exclusively used for construction of transducers
b) Exclusively used for stress analysis
c) Used for both stress analysis and construction of transducer
d) Pressure measurement

Ans : (c)

Q13. Certain type of materials generates an electrostatic charge or voltage when mechanical force is applied across them. Such materials are called
a) Piezo-electric
b) Photo-electric
c) Thermo-electric
d) Photo-resistive

Ans : (a)

Q14. Quartz and Rochelle salt belongs to _____ of piezo-electric materials
a) Natural group
b) Synthetic group
c) Natural or Synthetic group
d) Fiber group

Ans : (a)

UNIT-3

Q1. A general thermocouple instrument cannot be described with the feature of
(a) High sensitivity
(b)Dependence on ambient temperatures
(c) Small power loss.

ANS: C

Q2. Thermocouple instruments are also known as
(a) R.F. instruments
(b) PMMC instruments
(c) Rectifier instruments
(d) Digital instruments.

Q3. The capacitance microphone is used for the detection of
a) Heart rate
b) Blood flow
c) Heart sound
d) Foot pressure

Ans : (c)

Q4. Define Thermocouple?
Ans. A **thermocouple** is a device made by two different wires joined at one end, called junction end or measuring end. The two wires are called thermoelements or legs of the**thermocouple**: the two thermoelements are distnguished as positive and negative ones

Q5. What is Seebeck effect?

Ans The Seebeck effect refers to an electromotive force whenever there is a temperature gradient in a conductive material. Under open-circuit conditions where there is no internal current flow, the gradient of voltage (∇V) is directly proportional to the gradient in temperature (∇T):

$$\nabla V = -S(T)\nabla T,$$

where $S(T)$ is a temperature-dependent material property known as the Seebeck coefficient.

Q6. Define Thompson Effect?

Ans Thomson effect is related to the emf that develops between two parts of the single metal when they are at different temperature

- Thus thomson effect is the absorption or evolution of heat along a conductor when current passes through it when one end of the conductor is hot and another is cold If two parts of the metal are at small temperature difference dT ,themn the electric potential difference is proportional to dT
- dV=σdT where σ is the constant of proportinality and is known as thomson coefficent

Q7. Define Pitch?

Ans the quality of a sound governed by the rate of vibrations producing it; the degree of highness or lowness of a tone

Q8What is Sound Power Level?

Ans The total **sound** energy emitted by a source. per unit time is the **sound power**. All share as**level** the same unit of measure: the decibel (dB). In a medium, the sound power is given by

$$P = \frac{Ap^2}{\rho c}\cos\theta,$$

Where *A* is the area of the surface;

- ρ is the mass density;
- *c* is the sound velocity;
- θ is the angle between the direction of propagation of the sound and the normal to the surface.

Q9. Define Sound Pressure Level?

Ans **Sound pressure level** (**SPL**) or acoustic **pressure level** is a logarithmic measure of the effective **pressure** of a **sound** relative to a reference value. **Sound pressure level**, denoted L_p and measured in dB

Sound intensity, denoted **I** and measured in $W \cdot m^{-2}$ in SI units, is defined by

$$\mathbf{I} = p\mathbf{v},$$

Where *p* is the sound pressure;

- **v** is the particle velocity.

Q10. What is Peltier,?

Ans. In a Peltier-effect device, the electrodes are typically made of a metal with excellent electrical conductivity. The semiconductor material between the electrodes creates two junctions between dissimilar materials, which, in turn, creates a pair of thermocouple voltage is applied to the electrodes to force electrical current through the semiconductor, thermal energy flows in the direction of the charge carriers.

Peltier-effect devices are used for thermoelectric cooling in electronic equipment and computers when more conventional cooling methods are impractical.

UNIT-4

Q1. What is the DSO?

Ans. DSO is known as digital storage oscilloscope, it is used for storing the waveform in a digital form. It consits of a sample and hold circuit, control logic and an A/D converter the waveform can be stored in a buffer amplifier.

Q2. What is meant by special Oscilloscope?
Ans. The oscilloscope which is not only meant for viewing the waveform , but also used to perform some special functions such as storage of information, retrival of waveform, stability etc..

Q3. What is a Digital Voltmeter?
Ans. Digital voltmeters (DVMs) are usually designed around a special type of analog-to-digital converter called an integrating converter. Voltmeter accuracy is affected by many factors, including temperature and supply voltage variations. To ensure that a digital voltmeter's reading is within the manufacturer's specified tolerances, they should be periodically calibrated against a voltage standard such as the Weston cell.

Q4.What is meant by Virtual instrumentation?
Ans. Virtual instrumentation is a method of creating a Real time Environment in a virtual platform by Using software.

Q5.What is DAQ?
Ans. DAQ is known as Data Acquisition system, it is meant for collecting the data, organizing the data, processing the data and storing the results.

Q6.What is IEEE 488 bus?
Ans. IEEE 488 bus is formerly known as Hewlett Packard interface Bus. And later it was given IEEE standard and was known as IEEE 488 bus. It is used to interface the digital multimeters, digital voltmeters.

Q7.What are the various devices in IEEE 488 Bus?
Ans.Various devices in IEEE 488 Bus are Talkers. Listeners and Controllers.

Q8.What is meant by spectrum analyzer?
Ans. A spectrum analyzer separates an a.c. signal into its various frequency components and display search component as a vertical line on a CRT screen. The amplitude of each vertical line in the display represents the amplitude of each frequency component and the horizontal position of each line defines the frequency.

Q9.What are the applications of spectrum analyzer?
Ans. The applications of spectrum analyzer are as follows
Radars, Oceanography, Analyzing modulated signals.
Studying harmonic components of a signal Bio-medical fields

Q10.What are the advantages of spectrum analyzer?
Ans. The advantages of spectrum analyzers are High sensitivity, Better performance since it is operated at IF frequency

Q11.What is digital LCR meter?
Ans. This meter is mainly used to measure the resistance, inductance, capacitance and dissipation factor.

UNIT-5

Q1.Match the following

1. EEG	A. Diagnostic tool for heart alignment
2. ECG	B. Diagnostic tool for brain alignment
3. Sphygmo-manometer	C. Instrument used for measuring blood pressure
4. Stethoscope	D. instrument used to hear pulse/heart beat

a) 1- B, 2 – A, 3 – C, 4 – D
b) 1 – B, 2 – A, 3 – D, 4 – C
c) 1- C, 2 – A, 3 – B, 4 – D
d) 1 – A, 2 – B, 3 – C, 4 – D

Ans : (a)

Q2. Venturi is associated with
a) Venous blood pressure
b) Digital plethysmography
c) Dialysate flow in artificial kidney
d) Blood flow in heart lung machine

Ans : (d)

Q3. What is Resting Potential?
Ans The relatively static membrane potential of quiescent cells is called the **resting membrane potential** (or resting voltage), as opposed to the specific dynamic electrochemical phenomena called action potential and graded membrane potential.

Q4.What is Acting potential?
Ans. An **action potential** is a short-lasting event in which the electrical membrane potential of a cell rapidly rises and falls, following a consistent trajectory. Action potentials occur in several types of animal cells, called excitable cells, which include neurons, muscle cells, and endocrine cells, as well as in some plant cells. In neurons, they play a central role in cell-to-cell communication.

Q5. Define ECG?
Ans. ElectroCardio Gram

Q6. Define CT Scan?
Ans Computed Tomography. The CT scan can reveal anatomic details of internal organs that cannot be seen in conventional X-rays. The X-ray tube spins rapidly around the patient and the X-rays strike numerous detectors after passing through the body. These detectors are connected to sophisticated computers which generate images after image processing. The radiation dose of a CT scanner is much higher than a conventional X-ray, but the information obtained from a CT scan is often much greater.

Q8. Define EEG?
Ans An electroencephalogram (**EEG**) is a test that detects electrical activity in your brain using small, flat metal discs (electrodes) attached to your scalp. Your brain cells communicate via electrical impulses and are active all the time, even when you're asleep.

Q9. Define MRI?
Ans **Magnetic resonance imaging** (**MRI**) is a technique that uses a magnetic field and radio waves to create detailed images of the organs and tissues within your body. Most **MRI** machines are large, tube-shaped magnets. When you lie inside an **MRI** machine, the magnetic field temporarily realigns hydrogen atoms in your body.

Q10. What are different types of Electrodes?
Ans:- Different skin electrodes: (a) metal plate electrodes, (b) suction electrode for ECG, (c) metal cup EEG electrode, (d) recessed electrode, (e) disposable electrode with electrolyte-impregnated sponge (shown in cross-section), (f) disposable hydrogel electrode (shown in cross-section), (g) thin-film electrode for use with neonates (shown in cross-section), (h) carbon-filled elastomer dry electrode.