UNIT I - INTRODUCTION

1. Write the main static characteristics? (April/may 2008)
   The main static characteristics are:
   - Accuracy
   - Sensitivity
   - Reproducibility
   - Drift
   - Static error
   - Dead zone
   - Resolution
   - Precision
   - Repeatability
   - Stability

2. List the functional elements of the measurement systems. (Dec 2009)(Cbe)
   The three main functional elements of the measurement systems are:
   - Primary sensing element
   - Variable conversion element
   - Data presentation element

3. Write the different types of systematic errors. (Dec 2009)(Cbe)
   These types of errors are divided into three categories:
   - Instrument Errors
   - Environmental Errors
   - Observational Errors

4. What is standard? What are the different types of standards? (May/June 2006)
   A standard is a physical representation of a unit of measurement. The term standard is applied to a piece of equipment having a known measure of physical quantity.
   Types of Standards
   - International Standards (defined based on international agreement)
   - Primary Standards (maintained by national standards laboratories)
   - Secondary Standards (used by industrial measurement laboratories)
   - Working Standards (used in general laboratory)

5. Why must instruments be calibrated? (Nov/Dec 2008)
   Calibration of all instruments is important since it affords the opportunity to check the instruments against a known standard and subsequently to find errors and accuracy.
   Calibration Procedure involve a comparison of the particular instrument with either
   - a primary standard
   - a secondary standard with a higher accuracy than the instrument to be calibrated
   - a instrument of known accuracy
6. What is mean by accuracy of an instrument? (May/June 2007)
   It is the closeness with an instrument reading approaches the true value of the quantity being measured.

7. Define: Calibration (April/May 2005)
   Calibration is defined as the process by which comparing the instrument with a standard to correct the accuracy.

   **Static error:**
   Static error is defined as the difference between the true value and the measured value of the quantity.
   \[ \text{Static error} = A_t - A_m \]
   Where
   \[ A_m = \text{measured value of quantity} \]
   \[ A_t = \text{true value of quantity} \]
   **Reproducibility:**
   It is specified in terms of scale readings over a given period of time.

9. What is primary sensing element? (April/May 2005)
   The primary sensing element is that which first receives energy from the measured medium and produces an output depending in some way on the measured quantity (measured).

10. What are primary standards? Where are they used? (Nov/Dec 2005)
    - These are highly accurate absolute standards, which can be used as ultimate reference standards.
    - These primary standards representing fundamental units as well as some electrical and mechanical derived units are calibrated independently by absolute measurements at each of the national laboratories. These are not available for use, outside the national laboratories.
    - The main function of the primary standards is the calibration and verification of secondary standards.

11. What is the importance of dynamic characteristic of systems? (Nov/Dec 2008)
    When the quantity under measurement changes rapidly with time, it is necessary to find the dynamic relations existing between input and output. These types of characteristics are called as Dynamic Characteristics.

12. Why calibration of instrument is important? (Nov/Dec 2008)
    The calibration of all instruments is important since it affords the opportunity to check the instrument against a known standard and subsequently to errors in accuracy.

13. Define dynamic error
    Dynamic error is defined as the difference between the true value of the quantity changing with time and the value indicated by the measurement system if no static error is assumed. It is also called measurement error. It is one the dynamic characteristics.
13. Define threshold

Threshold is defined as the minimum value of the input at which the output starts changing / increasing from zero.

14. Mention the functions performed by the measurement system.

The functions performed by the measurement system are
- Indicating function
- Recording function
- Controlling function

15. State the function of measurement system.

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.
UNIT II
ELECTRICAL AND ELECTRONICS MEASUREMENTS
2 MARKS

1. Why the PMMC instruments are not used for a.c measurement? (Nov 2006)
   When the PMMC instruments are connected to a.c, the torque reverse as the current reverses and the pointer cannot follow the rapid reversals. Hence the deflection corresponding to mean torque is zero thus making the PMMC instrument not suitable for a.c measurements.

2. What is the basic principle PMMC instrument?
   A current carrying coil is placed in the magnetic field experiences a force proportional to the current it carries.

3. For which type of measurements PMMC devices are suitable.
   These are suitable only for D.C. In A.C torque produced on coil is reversing which cannot give accurate reading.

4. What are the sources of error in DC voltage measurement? (Apr/ May 2005)
   - Friction in the moving system
   - Heat generated changes the resistance of the working coil.
   - The ageing if the magnet and control spring.

5. List the possible causes of errors in moving iron instruments.
   - Hysteresis error
   - Temperature error
   - Stray magnetic field error
   - Frequency error
   - Eddy current error

6. Define instrumental error. (Dec 07)
   These errors are arises due to inherent short comings in the instrument, misuse of the instruments and loading effects.

7. Define limiting errors. (Dec 07)
   Instruments having analog meters are usually guaranteed to be accurate within certain percentage limits called limiting errors or guarantee errors.
   
   \[
   \text{Limiting error} = \text{accuracy} \times \text{full scale value}
   \]

8. State the essential torques required for successful operation of an instruments.
   - Deflecting torque
   - Controlling torque
   - Damping torque.

   The controlling torque is not present in energy meter. As the disc of energy meter has to rotor continuously and there is no need to reset its position any time, the controlling torque is not required.
10. Give the importance of iron loss measurement. (May/June 2007)

Many apparatus like transformer, generator, and motor etc. use magnetic materials for their construction. The design of transform core, armature for motor and generator is very important. To have high efficiency, the losses must be as minimum as possible. Hence from ideal designing point of view, the iron loss measurement is important.

11. Name the methods used in wattmeter calibration.

The methods used in wattmeter calibration are:
- Comparing with standard wattmeter.
- Using voltmeter ammeter method.
- Using Potentiometer.

12. Name the errors caused in Dynamometer type wattmeter.

- Error due to pressure coil inductance
- Error due to pressure coil capacitance
- Error due to methods of connection
- Error due to stray magnetic fields
- Error due to eddy current.

13. State the disadvantages of Dynamometer type wattmeter.

- Readings may be affected by stray magnetic fields.
- At low power factor it causes error.

14. State the advantages of Moving iron type instruments

- Less expensive
- Can be used for both dc and ac
- Reasonably accurate.

15. State the advantages of instrument transformers. (April/May 2008)

- Used for extension of range
- Power loss is minimum
- High voltage and currents can be measured.

16. State the disadvantages of PMMC instruments

- Cannot be used for ac m/s
- Some errors are caused by temperature variations.
UNIT III- COMPARISON METHOD OF MEASUREMENTS

1. **Write the two conditions to be satisfied to make an a.c. bridge balance? (MAY 2004)**
   The two conditions are,
   1. \[ |Z_1 Z_4| = |Z_2 Z_3| \]  
      ..........magnitude condition
   2. \[ \theta_1 + \theta_4 = \theta_2 + \theta_3 \]  
      ..........angle or phase condition

2. **Write four applications of A.c. Bridge? (MAY/JUNE 2007)**
   1. To measure unknown inductance.
   2. To measure unknown capacitance.
   3. To measure dissipation factor.
   4. To measure quality factor.
   5. To measure frequency.

3. **When Kelvin bridge is used and why?**
   In the Wheatstone bridge, the bridge contact and lead resistance causes significant errors, while measuring low resistances below 1Ω. To consider the effect of contact and lead resistance and to reduce the corresponding errors, the Kelvin Bridge is preferred over Wheatstone bridge to measure low resistances.

4. **What is important condition for Kelvin Bridge to achieve perfect balance condition?**
   To eliminate the effect of lead and contact resistances, it is necessary that in a Kelvin’s double bridge the ratio of the resistances of ratio arms (R1 / R2) must be same as the ratio of the resistances f the second ratio arms (a/b).

5. **State the difficulties in measuring high resistances?**
   - Due to high resistance, very small current flows through measuring circuit which is difficult to sense.
   - Presence of leakage currents.
   - The stray charges appearing due to electrostatic effects.
   - The delay time is required in the measurement so that charging and absorbing currents get stabilize. This time may be very long in some cases.
   - The very high voltage is required to raise the magnitude of current. This may damage the galvanometer if proper case is not taken.

6. **What is the basic principle used in potentiometer.**
   In potentiometer the unknown emf is measured by comparing it with a std known emf.

7. **Name the potentiometer material used.**
   - German silver
   - Manganin wire

8. **Define standardization.**
   It is the process by which adjusting the current flows through the potentiometer coil to make the voltage across the standardization cell is equal.
9. **State the applications of potentiometer.**
   - Used for m/s of unknown emf
   - Used for ammeter calibration
   - Used for Voltmeter calibration
   - Used for wattmeter calibration

10. **State the advantages of crompton potentiometer.**
    - More accurate
    - Easy to adjust

11. **What are the practical difficulties in ac potentiometers?**
    - More complicated
    - Accuracy is seriously affected
    - Difficulty is experienced in standardization.

12. **Classify ac potentiometers.**
    - Polar potentiometer
    - Coordinate potentiometer.

13. **How the phase angle is measured in polar type potentiometers.**
    It is measured from the position of phase shifter.

14. **Name some ac potentiometers.**
    - Drysdale Tinsley potentiometer
    - Gall Tinsley potentiometer

15. **State the advantages of ac potentiometers.**
    - Can be used for m/s of both magnitude and phase angle
    - Can be used for m/s of inductance of the coil.
    - It is used in m/s of errors in CTS

14. **State the applications of ac potentiometers.**
    - M/s of self inductance.
    - Ammeter calibration
    - Voltmeter calibration
    - Wattmeter calibration.

15. **What are the constructional parts of current transformer?**
    - Primary winding
    - Secondary winding
    - Magnetic core.

16. **Name the errors caused in current transformer.**
    - Ratio error
    - Phase angle error
UNIT IV- STORAGE AND DISPLAY DEVICES

1. List the components of a magnetic tape recorder. [NOV/DEC 2003]
   The components of a magnetic tape recorder are:
   i. Recording head
   ii. Magnetic head
   iii. Reproducing head
   iv. Tape transport mechanism
   v. Conditioning devices.

2. What are the advantages of magnetic tape recorders? [APRIL/MAY 2004]
   The advantages of magnetic tape recorders are:
   i. They have a wide frequency range from D.C. to several MHz. ii. They have low distortion,
   iii. They have a wide dynamic range which exceeds 50dB. This permits the linear recording from
       full scale signal level to approximately 0.3% of full scale.
   iv. The magnitude of the electrical input signal is stored in magnetic memory and this signal can
       be reproduced whenever desired. The reproduced signal can be analyzed by automatic data reduction methods.

3. Mention the different methods of magnetic tape recording. [MAY/ JUNE 2006]
   The different methods of magnetic tape recording are:
   i. Direct recording
   ii. Frequency modulation (FM) recording and
   iii. Pulse duration modulation (PM) recording

4. Mention is the purpose of erase head. [MAY/JUNE 2007]
   The purpose of erase head is to erase the content of magnetic tape. It consists of a signal
   of high frequency and level sweeps the magnetic tape thereby completely wiping out the
   information contained there. This renders the magnetic tape to be used fresh for another signal.

5. List the advantages of direct recording. [APRIL/MAY 2005]
   The advantages of direct recording are:
   - This recording process has a wide frequency response ranging from 50 Hz to about 2 MHz for a tape speed of 3.05 m/s. It provides the greatest bandwidth obtainable from a given recorder.
   - It requires only simple, modulately priced electronic circuitry.
   - It is used to record signals where information is contained in the relation between frequency and amplitude, such as spectrum analysis of noise.
• It can be used for recording voice and in multiplexing a number of channels of information into one channel of tape recording.

6. Mention the disadvantages of direct recording. [NOV/DEC 2005]
   The disadvantages of direct recording are:
   • Direct recording is used only when maximum bandwidth is required and when variations in amplitude are acceptable.
   • Direct recording can be used for instrumentation purposes but it is mainly used for recording of speech and music.

7. What is drop out?
   In direct recording, some portions of the tape may not be perfectly recorded owing to dirt or poor manufacture and this is called drop out.

8. Mention the two factors in frequency modulation recording. [APRIL/MAY 2008]
   The two factors in frequency modulation recording are:
   i. Percentage deviation
   and ii. Deviation ratio.

9. Define: percentage deviation
   Percentage deviation is defined as the carrier deviation to centre frequency.
   i.e. Percentage deviation or modulation index, \( m = \frac{\Delta f}{f_C} \times 100 \),
   where \( \Delta f \) = carrier deviation from centre frequency
   \( f_C \) = centre or carrier frequency

10. Define: Deviation ratio [NOV/DEC 2005]
    Deviation ratio is defined as the ratio of carrier deviation from centre frequency to signal or modulating frequency.
    Deviation ratio, \( \Delta = \frac{\Delta f}{f_M} \)
    Where, \( f_M \) = data signal

11. List few disadvantages of frequency modulation recording. [MAY/ JUNE 2006]
    The disadvantages of frequency modulation recording are:
    i. The circuitry of an FM recording system is more complicated than that of a direct recording system. This complexity of circuitry is an account of separate modulation systems.
    ii. It has a limited high frequency of about 80 kHz.
    iii. It requires a high tape speed.
    iv. It requires a high quality of tape transport and speed control and therefore expensive than the direct recording system.

12. Give few advantages of frequency modulation recording. [APRIL/MAY 2005]
    The advantages of frequency modulation recording are:
    i. It is useful when the D.C. component of the input signal is to be preserved or
when the amplitude variations of the direct recording process cannot be tolerated.

ii. This system has wide frequency range can record from D.C. voltages to several kHz.

iii. It is free from dropout effect.

iv. It is independent of amplitude variations and accurately reproduces the waveform of the input signal.

v. It is used extensively for recording the voltages from the force, pressure and acceleration transducers.

13. List the classification of printer. [NOV/DEC 2004]

Printers are classified into three brad categories. They are

i. Impact and non-impact printers.

ii. Fully formed character and dot matrix character printer

iii. Character at a time and a line at a time.


In dot-matrix printers, the characters are formed by printing a group of dots to form a letter, number or other symbol. It can print any combination of dots with all available print position in the matrix.

15. Enumerate the merits and demerits of pulse width modulation recording. [APRIL/MAY 2004]

The merits of pulse width modulation recording are:

- It has the ability to simultaneously record information from a large number of channels.
- It has a high accuracy due to the fact that it can be self-calibrated.
- It has a high 3/N ratio.

The demerits of pulse width modulation recording are:

- It has the limited frequency response
- It has a highly complex electronic circuitry and therefore, the reliability of such systems is low.
- It is used only for special applications such as flight recorders, where a large number of slowly changing variables are involved.

16. List the requirements of a sweep generator.

The requirements of a sweep generator are:

- The sweep must be linear.
- The spot must move in one direction only, i.e. from left to right only, else the signal will be traced backwards during the return sweep.
- This means that the sweep voltage must drop suddenly after reaching its maximum value.
- These requirements call for a sweep voltage having a linear saw tooth waveform.
17. List the important features of CRTs.

The important features of CRTs are:

i. Size

ii. Phosphor

or

iii. Operating voltages

iv. Deflection voltages

v. Viewing screen

18. CRO has become an universal tool in all kinds of electrical and electronic investigation.

Why?

CRO has become an universal tool in all kinds of electrical and electronic investigations because in CRO, the vertical input voltage is the voltage under investigation and it moves the luminous spot up and down in accordance with the instantaneous value of the voltage. When the input voltage repeats itself at a fast rate, the trace (display) on the screen, appears stationary on the screen.

19. List the characteristics of LCD.

The characteristics of LCD are:

i. They are light scattering.

ii. They can operate in a reflective or transmissive configuration.

iii. They do not actively generate light and depend for their operation on ambient or back lighting.
UNIT V- TRANSDUCER AND DATA ACQUISITION SYSTEM

1. Mention 2 disadvantages of capacitive transducer? (May-11)
   • Output impedance of capacitive transducer is very high. So its measuring circuit becomes very complicated.
   • The capacitance of capacitive transducer change with change in temperature or account of presence of small external matter.
     Example: dust particles, moisture.

2. Give the 2 types of principles for the operation of optical transducers (may-11)
   • INTRINSIC SENSOR: In this the fiber optic cables itself is the sensor.
   • EXTRINSIC SENSOR: In this fiber optic cable is only used to guide light to or from a conventional sensor.

3. Write the function of transducer (May-11)
   It converts one type of energy into another.

4. Give any 2 applications of smart sensors. (May-11)
   • Self calibration.
   • Computation.
   • Communication.
   • Multisensing.

5. Define inverse transducer with example (May-10)
   • An inverse transducer is defined as device which converts an electrical quantity into a non electrical quantity.
   • It is a precision actuator which has an electrical input and a low power non electrical output.

6. Mention any 4 types of analog to digital convertor? (May-10)
   • Flash type of convertor
   • Staircase convertor
   • Tracking convertor
   • Successive approximation type

7. What are the classifications of encoder? (Dec-10)
   • Tachometer transducers,
   • Incremented transducers,
   • Absolute transducers.

8. What is the need of sample and hold circuit in A/D convertor? (Dec-10)
   • Sample and hold circuits are the devices that store analog information and reduce the aperture time of an A/D convertor
• A sample hold is a simply a voltage memory device in which an input voltage is acquired and then stored on a high quality capacitor.

9. Define the primary and secondary transducers? (May 2010)

Primary Transducer:
When the input signal is directly sensed by the transducer and physical phenomenon is converted into electrical form directly then such a transducer is called the primary transducer.

Secondary Transducer:
When the input signal is sensed first by some detector or sensor and then its output being of some from other than input signals is given as input to a transducer for conversion into electrical form, then such a transducer falls in the category of secondary transducers.

10. State the performance parameters of ADC (May 2010)
• Resolution.
• Quantization error.
• Conversion time.

11. How do you classify transducers? (Dec 2010)
• On the basis of transduction form used.
• As primary and secondary transducers.
• As active and passive transducers.
• As analog and digital transducers.
• As transducers and inverse transducers.

12. What is telemetry? (Dec 2010)
Telemetry is a highly automated communications technique with the help of which measurements and data collection are done at remote.

13. What is piezo-electric effect? (Dec 2010)
A piezoelectric material is one in which an electric potential appears across certain surfaces of the crystal if the dimensions of the crystals are changed by the application of a mechanical force this potential is produced by the displacement of charges.
• This effect is reversible.
• This phenomenon is known as piezoelectric effect.

14. Explain the working principle of capacitive transducers? (Dec 2010)
The principle of capacitive transducer is based on the familiar equation of capacitance of parallel plate capacitor.

\[ C = \frac{\varepsilon A}{d} \]

15. What are the selection criteria for the transducer? (Jun 2009)
• Operating range.
• Sensitivity.
• Electrical output characteristics.
16. What is meant by strain gauge? What for it is used? (Jun 2009)
   It is an example of a passive transducer that uses the variation in electrical resistance in wires to sense the strain produced by a force on the wires.

17. What is POT? It is active or passive transducer? (Dec 2006)
   - POT is a resistive potentiometer used for the purpose of voltage division.
   - It consists for a resistive element provided with a sliding contact called as wiper.
   - The POT is a passive transducer since it requires an external power source for its operation.

18. Which are the materials used in piezo-electric transducer? (Jun 2006)
   - Rochelle salt.
   - Ammonium dihydrogen phosphate (ADP).
   - Quartz.
   - Ceramic made with barium titanate, dipottasium tartrate, potassium dihydrogen phosphate and lithium sulphate.

19. Name the transducer that uses sensing acceleration? (Jun 2006, May 2005)
   Piezo-electric transducer.

20. Mention the use of capacitive transducer? (May 2005)
   - Capacitive transducers can be used for measurement of both linear and angular displacements.
   - It can be used for measurement of force and pressure.
   - Can be used for measuring humidity.
   - It is used in conjunction with mechanical modifiers for measurement of volume, density etc.

20. Write any four basic requirements of transducer? (Dec 2004)
   - RUGGEDNESS: It should be capable for withstanding overload.
   - LINEARITY: The input-output characteristics should be linear.
   - NO HYSTERESIS: It should not give any hysteresis during measurement while input signal is varied from low to high value and vice versa.
   - RESIDUAL DEFORMATION: There should be no deformations on removal of load after long period of time.
UNIT – I

FUNCTIONAL ELEMENTS OF AN INSTRUMENT

PART – A

1. What are the functional elements of an instrument? (DEC 03, 11, MAY 09)
2. What is meant by accuracy of an instrument? (DEC 05, MAY 05, MAY 07)

3. Define international standard for ohm? (MAY 07)

4. What is primary sensing element? (MAY 05)

5. What is calibration? (MAY 05, 08, DEC 05)

6. Define the terms precision & sensitivity. (DEC 03, 05)

7. What are primary standards? Where are they used? (DEC 05, 06)

8. When are static characteristics important? (MAY 06, 10, DEC 10)

9. What is standard? What are the different types of standards? (DEC 05, MAY 07, 04, 11)

10. Define static error. Distinguish reproducibility and repeatability. (DEC 04)

11. Distinguish between direct and indirect methods of measurements. (DEC 07)

12. Name some static and dynamic characteristics. (MAY 04)

13. State the difference between accuracy and precision of a measurement. (MAY 03, 10, DEC 09)

14. What are the functions of instruments and measurement systems? (DEC 07)

15. What is an error? How it is classified? (MAY 03, 09 DEC 04, 08, MAY 03 08)

16. What are the sources of error? (DEC 07)

17. Define resolution. (DEC 09)
18. What is threshold? (DEC 09)

19. Define zero drift. (DEC 03, MAY 06)

**PART – B**

1. Describe the functional elements of an instrument with its block diagram. (MAY 05, 07, 09, 10 DEC 07,09,10) (16)

2. What are the three categories of systematic errors in the instrument and explain in detail. (MAY 06, 07, DEC 05, 06, 07,09,11)

3. Explain in detail calibration technique and draw the calibration curve in general. (MAY 04, 11, DEC 06, 07)

4. Discuss in detail various types of errors associated in measurement and how these errors can be minimized? (MAY 06,07, DEC 05, 06, 07, 09, 11)

5. Define the following terms in the context of normal frequency distribution of data (MAY 05 ,08, 10, 11 DEC 07, 08,)

   a) Mean value, b) Deviation, c) Average deviation, d) Variance

   e) Standard deviation.

6. Define and explain the static characteristics of an instrument. (MAY 06, 11 DEC 04, 08, 09, 11)

7. Define and explain the types of static errors possible in an instrument. (MAY 05,06,07,11, DEC 04, 05, 06, 07,08, 09, 11)

8. Discuss in detail the various static and dynamic characteristics of a measuring system. (MAY 06, 11 DEC 04, 08, 09, 11)

9. For the given data, calculate (MAY 05 ,08, 10, 11 DEC 07, 08,)

    a) Arithmetic mean, b) Deviation of each value,

    c) Algebraic sum of the deviations

    \[ X_1 = 49.7, \ X_2 = 50.1, \ X_3 = 50.2, \ X_4 = 49.6, \ X_5 = 49.7 \]

9. Explain in detail the types of static error. (MAY 06, 07, DEC 05, 06, 07,09,11)
10. What is standard? Explain the different types of standards? (MAY 05, 08, DEC 10, 11)

UNIT – II

ELECTRICAL AND ELECTRONICS INSTRUMENTS

PART – A

1. State the principle of digital voltmeter. (MAY 07)
2. Give the importance of iron loss measurement. (MAY 07)
3. List two instruments for measurement of frequency. (DEC 04)
4. Write the function of instrument transformer. (DEC 04)
5. Write any two advantages and disadvantages of digital voltmeter. (MAY 06)
6. Explain the purpose of Schmitt trigger in digital frequency meter. (MAY 05)
7. Which torque is absent in energy meter? Why? (MAY 06)
8. Give classification of digital voltmeter. (MAY 03, 05, 09, 04, 06, 11)
9. Which meter is useful for measuring only d.c. quantities? (DEC 10)
10. State the advantages of moving iron instrument. (MAY 09)
11. Define nominal ratio of instrument transformers. (MAY 04)
12. What are transfer instrument? (MAY 07)
13. Why the PMMC instruments are not used for ac measurements? (DEC 06)
14. What is the principle of ram type digital voltmeter? (MAY 05)
15. What are the essential parts of ramp type DVM? (DEC 04)
16. Write the function of instrument transformer. (DEC 04)
17. List the advantages of electronic voltmeter. (DEC 04)
18. What is mean by creeping in energy meter? (MAY 04)
19. What is phase meter and what is its type? (DEC 09)
20. Differentiate ammeter and voltmeter. (DEC 06, MAY 11)
PART – B

1. Describe the construction and working of a permanent magnetic moving coil instruments. (DEC 04, 06 MAY 05, 07)
2. Explain the design of three phase wattmeter and give the reactive power measurement in 3Φ circuits. (MAY 08)
3. How B-H curve is determined for a ring specimen. (DEC 08, 11, 10, MAY 04, 06, 07, 11)
4. Explain the function of three phase wattmeter and energy meter. (MAY 08)
5. Discuss in detail the working of the successive approximation DVM. (DEC 05)
6. Explain with a neat sketch the construction and working principle of 1Φ induction type energy meter. (DEC 03, 06, 09, MAY 05, 08, 09, 11)
7. With a neat diagram explain the construction and working of electrodynamometer type instruments. Also derive its torque equation. (MAY 06)
8. Explain with neat diagram the working of linear ramp type DVM. (MAY 04, 06)
9. With block diagram explain the working principle of digital frequency meter. (DEC 11, MAY 04, 09, 10)
10. Give detailed notes on Instrument transformers. (DEC 05, 09, MAY 11)

UNIT – III

COMPARISON METHODS OF MEASUREMENTS

PART – A

1. Draw Maxwell’s AC Bridge and give the balance equation in terms of resistance. (MAY 07)
2. Explain any two technical parameters to be considered in grounding. (MAY 07)
3. Give some applications of Wheatstone’s bridge. (DEC 04)
4. What is a potentiometer? (DEC 04)
5. List the applications of dc and ac potentiometer. (MAY 06)
6. Differentiate the principle of dc potentiometer and ac potentiometer. (MAY 05)
7. What is meant by transformer Ratio Bridge? (MAY 06)
8. What are the features of ratio transformer? List its applications. (DEC 10)
9. What is meant by electromagnetic interference? (MAY 09)
10. List the sources of electromagnetic interference. (MAY 04)
11. What are the ways of minimizing the electromagnetic interference? (MAY 07)
12. Define electromagnetic compatibility. (EMC) (DEC 06)
13. What are the main causes of group loop currents? (MAY 05)
14. What are the limitations of single point grounding method? (DEC 04)
15. What is the necessity of grounding and state is advantages. (DEC 04)
16. What is meant by ground loop? How it is created? (DEC 04)
17. What are the sources of errors in bridge measurement? (MAY 05)
18. Define standardization. (DEC 06, MAY 11)
19. Give the relationship between the bridge balance equation of DC Bridge and AC Bridge. (MAY 05)

**PART B**

1. Explain in detail about the laboratory type DC potentiometer. (MAY 07, DEC 10)
2. Give the applications of AC potentiometers. (DEC 07)
3. Describe about the multiple earth and earth loops. (DEC 09, 11, MAY 10)
4. Explain the different techniques of grounding. (DEC 09, 11, MAY 10)
5. With fundamentals distinguish between DC and AC potentiometers, and give any two specific applications for each. (MAY 09, DEC 11)
6. Discuss the advantages and limitations of electromagnetic interference in measurements. (MAY 10, DEC 07, 08, 11)
7. Explain Kelvin’s double bridge method for the measurement of low resistance. (MAY 10 DEC 10)
8. Explain how inductance is measured by using Maxwell’s bridge. (MAY 09, DEC 08)
9. Explain the working principle of Anderson’s bridge and also derive its balance equations. (MAY 08, DEC 04)
10. Explain the working principle of Schering Bridge and also derive its balance equations. (MAY 05, 11, DEC 08)
11. Explain the frequency measurement in Wien’s bridge (DEC 08)
UNIT – IV

STORAGE AND DISPLAY DEVICES

PART – A

1. What is meant by deflection sensitivity of a CRT? (MAY 07)

2. Write two advantages of LED in electronic displays. (MAY 07)

3. State the features of ink-jet printers. (DEC 04)

4. Differentiate between LED and LCD. (DEC 04)

5. What are the different types of magnetic recording? (MAY 06)

6. What are the different materials used in LED? Also name the colours emitted. (DEC 07)

7. Give a short note on LED. (DEC 04)

8. What is delayed sweep? (MAY 04)

9. Explain the characteristics of Time domain output device using in measurements. (DEC 06)

10. Explain the following term as applied to digital displays.

   3½ digit and 4½ digit displays. (MAY 05)

11. What is a recorder and what are the types of it? (DEC 11)

12. What is magnetic tape recorder? (MAY 04)

13. What are the basic components of a tape recorder? (DEC 10)

14. List the advantages and disadvantages of direct recording? (MAY 09)

15. What are the advantages and disadvantages of digital data recording? (DEC 05)
16. Compare line printer and dot matrix printer. (MAY 11)

17. What is CRO? What are the sections of a CRO? (MAY 10)

18. List the advantages of digital storage oscilloscope. (DEC 09)

19. Differentiate between dual trace and dual beam CRO. (MAY 09)

PART – B

1. Describe the construction and working of LCDs, mention the difference between light scattering and field effect types of LCDs, and also explain the advantages of LCDs (DEC 05, 07, 08, MAY 06, 07)

2. Give the basic block diagram of a digital data recording system. (DEC 09)

3. Explain with a neat sketch (MAY 04, 06, 11, DEC 06, 10)
   a) Dot matrix displays b) Bar graph displays

4. Explain the basic elements of a magnetic tape recorder. (MAY 04, 05, 08, 09, 10, 11 DEC 03, 05, 06, 07, 11)

5. Explain the block diagram of oscilloscope with a neat sketch (MAY 07, 11, DEC 05)

6. Describe the basic components of a CRT. (MAY 04, 06, 09, DEC 10, 11)

7. Write short notes on liquid crystal displays. (DEC 05, 07, 08, MAY 06, 07)

8. With a neat block diagram, explain the working of digital storage oscilloscope. (MAY 07, 11, DEC 05)

9. Discuss briefly about the applications of LED. (MAY 04, 09, DEC 09)

10. Discuss in detail the construction of a storage type oscilloscope. What are the accessories for a CRO? (MAY 07,
    DEC 05)

11. Describe the performance of digital plotter. (MAY 07, DEC 10)

12. Write short notes on Printers. (MAY 04, 06, 11, DEC 06, 10)
UNIT – V

TRANSDUCERS AND DATA ACQUISITION SYSTEMS

PART – A

1. Define transducer. (MAY 11)
2. Define inverse transducer with example. (MAY 07)
3. Explain the principle of piezoelectric transducers and name any two piezoelectric materials. (MAY 07)
4. Name the transducers used for sensing acceleration. (DEC 04)
5. Mention the use of capacitive transducers. (DEC 09)
6. Classify the transducers and what is the other name of it. (MAY 07)
7. What are active and passive transducers? Give examples. (MAY 05)
8. What are the characteristics of transducers? (DEC 05)
9. What is meant by data acquisition system? List its types. (MAY 06)
10. Give the operating principle of a resistive transducer. Also give some examples (MAY 10)
11. What is piezoelectric effect? (DEC 11)
12. What is LVDT? (MAY 05)
13. List the advantages and disadvantages of LVDT. (DEC 06)
14. What is thermocouple? (MAY 06)
15. What are the advantages and disadvantages of LVDT? (DEC 06)
16. What is seeback voltage? (MAY 06)
17. What is strain gauge? List its types. What is gauge factor? Give its expression. (MAY 08)
18. What is resistance thermometer? (DEC 08)
19. What are the salient features of thermistor? (MAY 08)
20. What are capacitive transducers? Give the expression for a capacitance of a capacity transducer. (MAY 09)
PART – B

1. Explain the principle of inductive and capacitive transducer. (MAY 05, 07, 09, DEC 05, 07, 11)
2. Explain the construction and working of LVDT with a neat sketch (DEC 03, 06, 08, 09, MAY 05)
3. Discuss in detail about resistive transducers. (DEC 11)
4. Explain the various types of temperature transducers. (DEC 04, 05, 08)
5. Explain the function of piezoelectric transducer. (DEC 04, 11, MAY 04, 09, 10, 11)
6. Explain the binary weighted resistor technique of D/A conversion. (MAY 04, 06, 07)
7. Describe the piezoelectric transducer and give the formula for coupling coefficient. (DEC 04, 11, MAY 04, 09, 10, 11)
8. Discuss R-2R ladder type D/A converter. (DEC 05)
9. Explain the various types of ADC with suitable sketches. (DEC 09)
10. Explain the working principle of various types of DAC with neat sketches. (MAY 04, 06, 07)
11. Explain the successive approximation type ADC. (DEC 06, 07, 08, 10, MAY 05)