1. **List any three applications of sodium vapour lamp.**

Lighting in outdoor areas like

- roadways,
- parking lots,
- security areas,
- airports,
- Goods yards.

2. **What do you mean by charging of a battery?**

During charging of battery, external DC source is applied to the battery. The negative terminal of the DC source is connected to the negative plate or anode of the battery and positive terminal of the source is connected to the positive plate or cathode of the battery. As the positive terminal of the DC source is connected to the cathode, the electrons of this electrode will be attracted by this positive terminal of DC source Oxidation takes place in the cathode and due to external DC source, electrons will be injected in the anode reduction, takes place in anode

3. **List the elements of air conditioning system.**

- Fans
- Filters
- Refrigerating plant
- Means for warming
- Means for humidification
- Control system

4. **What are the applications of fluorescent lamp?**

- Fluorescent lamps can provide light output in large area, thus these lamps are suitable for lighting in industrial applications.
- Fluorescent lamps are used for lighting in offices as they provide uniform light level.
- In residential applications, the fluorescent lamps provide effective lighting for kitchens, valences, and fascia, etc.
- Fluorescent lamps are also used in classroom lighting and retail lighting, etc.

5. Write down the advantages of Ni-Cd Battery.

1. Low internal Resistance
2. Long life time and low maintenance cost.
3. Can tolerate deep discharge cycle about 5 hours.

6. Define Illumination.

Illumination is defined as the energy of light (ε) striking a surface of specific unit area per unit time.

7. Compare sodium vapour and Mercury Vapour Lamp

Characteristics	Sodium Vapour lamp	Mercury vapour lamp
Average life	3000 hrs	3000 hrs
Efficiency	60 - 70 lm/W	40 lm/W
Colour of light	Yellowish, colour distortion is produced	They suffer from colour distortion
Applications	Street Lighting	Highway lighting, Parks

8. Define Luminous Intensity.

The measure of the power of the emitted light, by a light source in a particular direction, per unit solid angle is called as luminous intensity

9. List the types of A/D converter and D/A converter

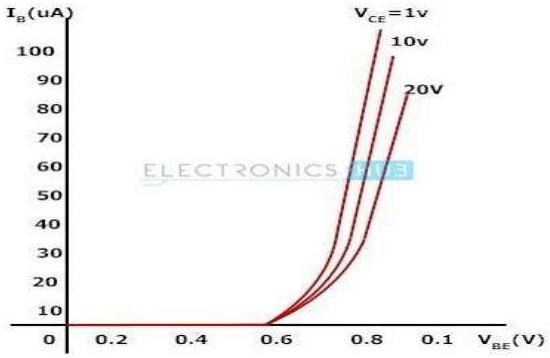
A/D

- Successive approximation
- Flash type

D/A

- Single slope
- Dual slope

10. Draw the Input Characteristics of CE Amplifier?



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11. Compare Inverting and Non inverting op-amp.

Ideal Inverting Amplifier	Ideal Noninverting Amplifier
1. Voltage gain = $- R_f / R_1$	1. Voltage gain = $1 + (R_f / R_1)$
2. The output is inverted with respect to input.	2. No phase shift between input and output.
3. The voltage gain can be adjusted as greater than, equal to or less than one.	3. The voltage gain is always greater than one.
4. The input impedance is R_1	4. The input impedance is extremely large.

12. Differentiate between zener breakdown and avalanche breakdown.

(Any 4 points)

Zener Breakdown	Avalanche Breakdown
The process in which the electrons move across the barrier from the valence band of p-type material to the conduction band of n-type material is known as Zener breakdown.	The process of applying high voltage and increasing the free electrons or electric current in semiconductors and insulating materials is called an avalanche breakdown.
This is observed in Zener diodes having a Zener breakdown voltage V_z of 5 to 8 volts.	This is observed in Zener diode having a Zener breakdown voltage V_z greater than 8 volts.
The valence electrons are pulled into conduction due to the high electric field in the narrow depletion region.	The valence electrons are pushed to conduction due to the energy imparted by accelerated electrons, which gain their velocity due to their collision with other atoms.
The increase in temperature decreases the breakdown voltage.	The increase in temperature increases the breakdown voltage.
The VI characteristics of a Zener breakdown has a sharp curve.	The VI characteristic curve of the avalanche breakdown is not as sharp as the Zener breakdown.
It occurs in diodes that are highly doped.	It occurs in diodes that are lightly doped.

13. Write the necessity of ADC.

(ADC) is used to convert an analog signal such as voltage to a digital form so that it can be read and processed by a microcontroller. Most microcontrollers nowadays have built-in ADC converters. It is also possible to connect an external ADC converter to any type of microcontroller.

14. Define Biasing.

Bias is direct current (DC) deliberately made to flow, or DC voltage deliberately applied, between two points for the purpose of controlling a circuit .

15. What is peak inverse voltage?

Peak Inverse Voltage (PIV) or Peak Reverse Voltage (PRV) refer to the maximum voltage a diode or other device can withstand in the reverse-biased direction

16. What is doping.

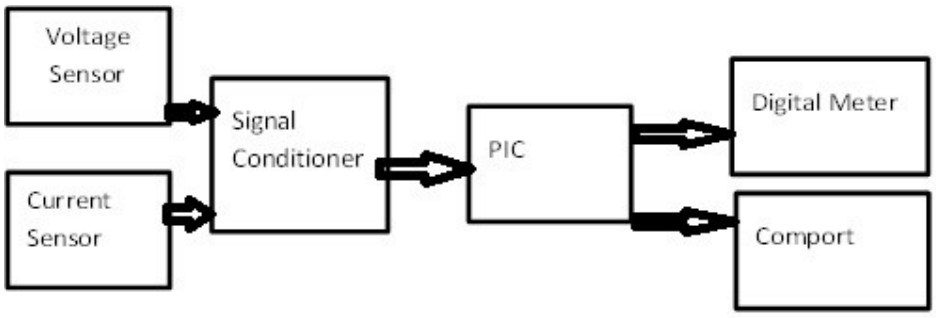
The conductivity of metal is increased by adding an appropriate amount of suitable impurity. This process is known as doping.

17. On what principle does the PMMC instruments.

Principle of moving coil instruments.

The basic moving coil instrument working principle is that when a current carrying conductor is placed in a magnetic field, a mechanical force is exerted on the conductor, which produces deflecting torque. Thus, the pointer attached to the spindle in deflected over the calibrated scale.

18. Draw the Block Diagram of Digital Energy Meters.



19. Define Fidelity.

It is defined as the degree to which a measuring instrument is capable of faithfully reproducing the changes in input, without any dynamic error.

20. Differentiate accuracy and precision.

Accuracy

Accuracy indicates the closeness of the measured value with the actual or true value and is expressed in the form of the maximum error (= measured value – true value) as a percentage of full-scale reading.

Precision

It is the measure of reproducibility i.e., given a fixed value of a quantity, precision is a measure of the degree of agreement within a group of measurements

21. What are the types of torques in indicating instruments.

1.Deflectiong Torque

2.Controlling Torque

3.Damping Torque.

22. What are the selection criteria for the transducer? (Any 2 points)

Measurement Type	The most fundamental factor is what physical quantity you're trying to measure. Common examples include pressure, temperature, force, displacement, light intensity, etc. Different transducers are designed for specific quantities.
Measurement Range	Consider the range of values you expect to encounter during measurement. The transducer's operating range should comfortably encompass these values to ensure accurate readings.
Accuracy and Resolution	Accuracy refers to how close the reading is to the true value, while resolution refers to the smallest detectable change in the measured quantity. Choose a transducer with appropriate accuracy and resolution for your application.
Environmental Conditions	The environment where the transducer operates can significantly impact its performance. Consider factors like extreme temperatures, high pressure, or corrosive elements that might affect the transducer's accuracy or lifespan.
Physical Size and Mounting	The physical size and shape of the transducer should be compatible with the available space in your setup. Think about how the transducer will be mounted and ensure it integrates seamlessly with your system.
Output Signal	The transducer's output signal type (voltage, current, digital) needs to be compatible with the data acquisition system that will be used to record and process the measurements.

Additional Considerations	* Response Time: How quickly does the transducer need to react to changes in the measured quantity? This is crucial for capturing dynamic processes. * Sensitivity: How much output change does the transducer produce for a given change in the measured quantity? Higher sensitivity can be desirable for detecting small variations. * Cost: Transducers come in a range of prices. Consider the cost in relation to the required performance and how it fits your budget.

23. **What is the main difference between moving coil and moving iron instruments? (Any 4 points)**

Moving Iron Instruments	Moving Coil Instruments
There is the use of soft iron pieces in a magnetic field generated by a current-carrying coil.	Use suspend coil in the magnetic field generated by a permanent magnet
The deflection of the iron piece is proportional to the electrical quanity that is measured	The coil deflection is proportional to the electrical quantity measured
it can measure both AC and DC parameters	It is limited to measuring the dc parameters
It has different ranges of frequency response	It has a narrow frequency range
It is not correct as moving coil instruments	It is accurate and provides good resolution than moving iron
It prone to wear and tear	it is less prone to wear and tear
it needs additional maintenance	it needs less maintenance

Moving Iron Instruments	Moving Coil Instruments
it has lower sensitivity	it has high sensitivity

24. List the main functions of controlling toque in measuring instruments.

- Limits Pointer Movement
- Proportionality to Measured Quantity
- Prevents Overshoot
- Maintains Readability