

1. Who needs a gauss meter? Where can a gauss meter be used.

- The gauss meter is a reliable measuring device for **measuring the existing magnetic field**. This gauss meter is suitable for **measuring both static/permanent magnet (DC) and alternating magnetic (AC) fields**.
- Gauss Meters allow for non-destructive magnetic field measurement in cases of **DC or AC Motors, loudspeakers, magnetic circuits, or components such as relays, magnetic switches or coils**, classification of magnets and even for residual or stray magnetic/leakage fields.

2. What is an intrinsic semiconductor?

- An intrinsic semiconductor, also called an undoped semiconductor or i-type semiconductor, is a **pure semiconductor without any significant dopant species present**.

3. The Hall coefficient R_H for a sample material is independent of?

- The Hall coefficient (R_H) and mobility (μ_H) are independent of **magnetic and electric fields**; however, they change with film thickness and composition of the film.

4. What is the Hall Effect?

- **If a current carrying conductor is placed in a perpendicular magnetic field, a potential difference will generate in the conductor which is perpendicular to both magnetic field and current. This phenomenon is called Hall Effect.**

5. How can a coherent laser single mode source be correctly coupled to a long length of multimode fibre and multimode receiver?

- Most sources use single mode cables for single mode coherent lasers as connecting them to multimode cables can get quite complex and create compatibility issues. One of the issues associated with them is DMD or differential mode delay as single mode launches into multimode fibre cable centre which is somewhat uncertain. In case of lasers or devices with digital signals, there is, thankfully, a solution to this issue. **Single mode fibre with an offset of about 15 microns can be coupled with offset launch cables.**

6. What type of fibre is required to run at gigabit speed?

- **50-micron multimode fibre** is a suitable option for gigabit data transmission. It offers a bandwidth of **500 MHz-km**. It offers a transmission window for **850 nm and 1300 nm** wavelengths.

7. What are the advantage of bridge rectifier over centre taped full wave rectifier?

- The main advantage of the bridge rectifier is that **it produces almost double the output voltage as with the case of** a full-wave rectifier using a centre-tapped transformer. But **this circuit doesn't need a centre-tapped transformer, so it resembles a low-cost rectifier.**

8. How does the avalanche breakdown voltage vary with temperature?

- Concerning the increase of the avalanche breakdown voltage with temperature. Yes, as you described, **as the temperature increases the thermal vibration increases and the mean free path decreases.** Hence, the breakdown voltage **increases with the temperature increase.**

9. What is elastic limit?

- Elastic limit, **maximum stress, or force per unit area within a solid material that can arise before the onset of permanent deformation.**

10. Which one is more elastic, foam or iron?

- **Iron,** because iron can regain its original shape or length more easily than foam.

11. Define Young's MODULUS.

- **Young's modulus** or the modulus of elasticity in tension or compression (i.e., negative tension), is a mechanical property that measures the tensile or compressive stiffness of a solid material when the force is applied lengthwise.
- **The mechanical property of a material to withstand the compression or the elongation with respect to its length.**

12. What is Zener breakdown.

- The **Zener effect** (employed most notably in the appropriately named **Zener diode**) is a type of **electrical breakdown**, discovered by **Clarence Melvin Zener**. It occurs in **a reverse biased p-n diode when the electric field enables tunnelling of electrons from the valence to the conduction band of a semiconductor, leading to numerous free minority carriers which suddenly increase the reverse current.**

13. What are the advantages of ultrasonic level sensors?

- The ultrasonic level measurement is suitable for **measurement in liquid and solid.**
- It is **simple in construction and design.**
- It does not require contact with processed material.
- It provides **continuous level measurement.**

- It has **high accuracy**.
- **The sensitivity is high.**

14. The experiment which directly determines both the sign and density of charge carriers in a sample material is?

➤ **Hall effect**

15. What is gauss meter?

➤ **An instrument that indicates the strength of a magnetic field at any point directly in gauss.**

16. What mode should we put the Arduino pin to, in order for object detection to work with the ultrasonic sensor?

➤ **Digital**

➤ **The TRIGGER pin is to be kept HIGH for a period of 10 microseconds** meanwhile the **ECHO pin is HIGH** for the time period it takes for the sent Ultrasonic wave to return to the sensor. Thus, the entire detection is digital.

17. Define Stress and Strain.

➤ Stress is a **physical quantity that expresses the internal forces that neighbouring particles of a continuous material exert on each other, while strain is the measure of the deformation of the material.**

18. How do conductivities of metal and semiconductor depend on temperature?

➤ **If increase then loses its conductivity.**

19. The resistivity of pure germanium under standard condition is about

➤ **60Ωcm**

20. What is doping?

➤ Doping is the intentional **introduction of impurities into an intrinsic semiconductor for the purpose of modulating its electrical, optical, and structural properties.**

21. What does avalanche break down means?

➤ Avalanche breakdown (or “the avalanche effect”) is a phenomenon that can occur in **both insulating and semiconducting materials**. It is a form of electric current multiplication that **can allow very large currents within materials** which are otherwise good insulators. It is a type of **electron avalanche**.

22. Stress, Strain and Young Modulus?

- Young modulus is defined as the **ratio of tensile stress (σ) to tensile strain (ϵ)**. Where stress is the amount of force applied per unit area (**$\sigma = F/A$**) and strain is extension per unit length (**$\epsilon = dl/l$**).

23. Types of extrinsic semiconductor?

- **P-type (p for positive: a hole has been added through doping with a group-III element) and n-type (n for negative: an extra electron has been added through doping with a group-V element).**

24. In semiconductor, conduction is due to?

- **Both holes and electrons.** In **P-type materials holes are in larger number** compared to free electrons, and they are the majority carriers. In **N-type, free electrons are the majority carriers.**

25. Gases and liquid have elasticity or not?

- **Yes, their volume changes under action of pressure.**