2 LAB SESSION 2

To control the intensity of light by sounding a buzzer using a Photo- conductive Cell

2.1 Learning Objective:

At the end of this study, the student will be able to:

- To use different parts of Transducers and Instrumentation Trainer including photoconductive cell, comparator, and electronic switch.

2.2 Apparatus

In order to complete the demonstration, we need a number of pieces of equipment.

- Photoconductive Cell
- Lamp Filament
- Power Amplifier
- Voltmeter
- Potentiometer
- Comparator
- Electronic Switch
- Buzzer

2.3 Main Parts of Transducers and Instrumentation Trainer

1. Power Supply Section
2. Sensors Panel
3. Transducer Panel
4. Potential Dividers
5. Switching Section
6. Sound Section
7. Position Sensors Section
8. Pressure test Section
9. Light Sensitive Section
10. Temperature Test Section
11. Tachometer Test Section

2.4 Display Section Related theory

The photoconductive cell is a two terminal semiconductor device whose terminal resistance will vary (linearly) with the intensity of the incident light. For obvious reasons, it is frequently called a photoresistive device.

The photoconductive materials most frequently used include cadmium sulphide (CdS) and cadmium selenide (CdSe). Both materials respond rather slowly to changes in light intensity.

The peak spectral response time of CdS units is about 100 ms and 10 ms for CdSe cells. Another important difference between the two materials is their temperature sensitivity. There is large change in the resistance of a cadmium selenide cell with changes in ambient temperature, but the resistance of cadmium sulphide remains relatively stable. The spectral response of a cadmium sulphide cell closely matches thatof the human eye, and the cell is therefore often used in applications where human vision is a factor, such as street light control or automatic iris control for cameras.
The essential elements of a photoconductive cell are the ceramic substrate, a layer of photoconductive material, metallic electrodes to connect the device into a circuit and a moisture resistant enclosure.

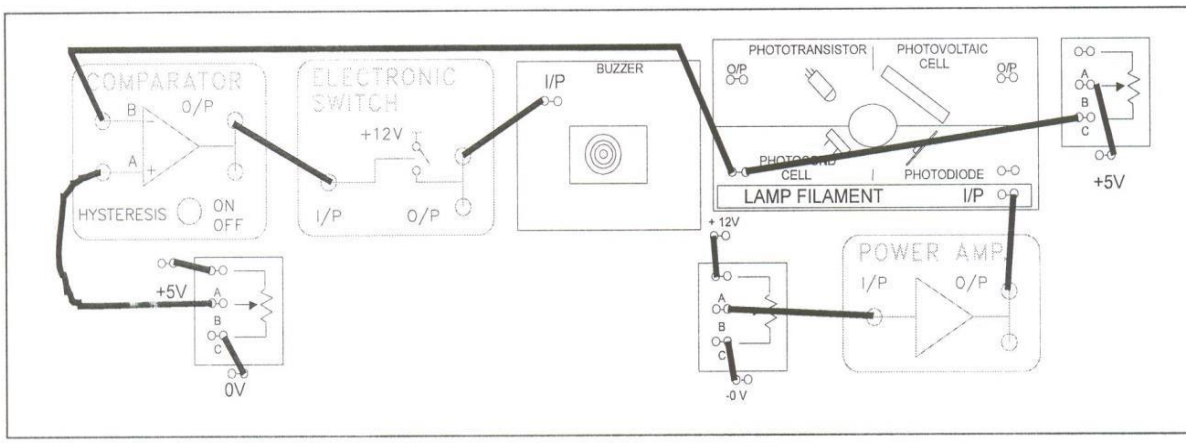

Figure 2 -1 Photoconductive Cell Circuit

2.5 Experimental procedure:

1) Set up the equipment and identify its components.

2) Connect the circuit as shown in figure and adjust the sliding potentiometer of 10KΩ in position 2 so that the resistance with the load of the photoconductive cell will be approximately 2KΩ.

3) Adjust the potentiometer of 100KΩ, so that the voltage at which we want to make the buzzer sound (for example 1V) will enter the comparator.

4) At the luminous intensity increases (turning the potentiometer of 10 windings) the output voltage of the photo conductive cell will decrease; when it falls below 1V, the buzzer begins to sound.

Note: Using a digital voltmeter, it can be seen how the voltage at the output of the photoconductive cell falls when the voltage of the lamp filament increases, due to a reduction in the resistance of the cell.

2.6 Observations & Calculations

2.7 Conclusion: