

- Class-11

Learning sending SMS with Arduino.

Handle TC35 GSM module and send SMS using an Arduino UNO.

How to connect TC35 GSM module?

Power supply:

- ⓐ Connect module's Vcc pin to a suitable power source.
- ⓑ Connect GND to the ground of the power supply and Arduino.

Serial communication:

- ⓐ Connect module's Tx to Arduino's Rx.
- ⓑ Connect module's Rx to Arduino's Tx.

Class 12

Learning: Coils

- ⑩ basic inductions \rightarrow coils.
- ⑪ explains how inductor works in DC circuits,
how they store energy and concept of Lenz Law.

Len'z Law:

"The direction of the induced EMF is such that it opposes the change in magnetic flux that caused it."

$$E = - \frac{d(\Phi_B)}{dt} \quad \begin{matrix} \text{magnetic} \\ \text{flux} \end{matrix}$$

Induced

EMF

(-) sign indicates the direction of the induced EMF as per Len'z Law.

Class-13

Learning: Coils.

explain → ④ concept of resistance.

⑤ a form of resistance created by inductors.

⑥ how reactance affects current flow and phase shifts in circuits, using LEDs, transformers and a functional generator.

Class-14

Learning: Capacitors

④ fundamental of Capacitors.

Storing energy through electrostatic field.

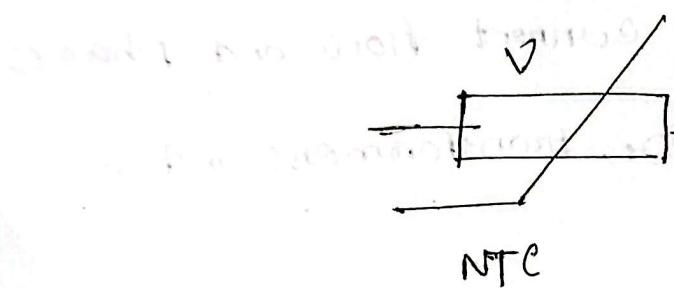
Capacitance improved by increasing plate surface area or using dielectric materials.

They behave differently in DC and AC.

Class-15

Learning: Temperature measurement, NTC, PT100, Wheatstone bridge.

NTC thermistors:

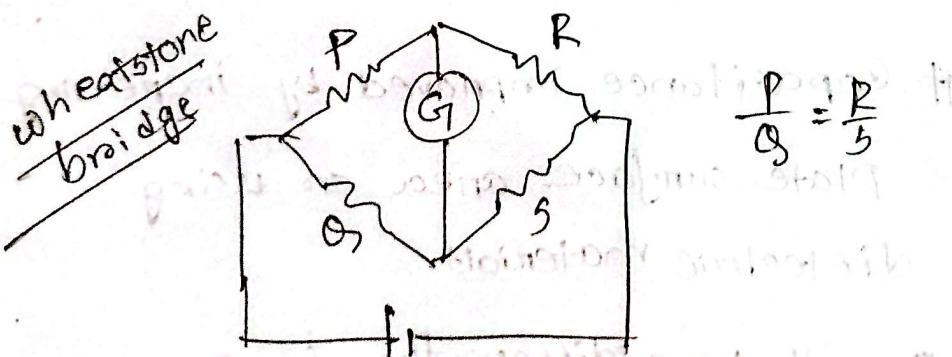


(Negative temperature co-efficient)

PT 100 sensor: Resistive temperature detector (RTD).

↳ Operates based on the principle that the electrical resistance of platinum increases.

Predictably with temperature.



Class - 16

Learning: Resistors.

w. connecting an LED to a battery.

w. current limiting resistor prevents too much current from flowing.

$$\textcircled{R} \quad R = \frac{V_{\text{Supply}} - V_{\text{LED}}}{I}$$

Power: $P = I^2 R = \frac{V^2}{R} = VI$

Voltage Divider: $V_{\text{out}} = V_{\text{in}} \cdot \frac{R_2}{R_1 + R_2}$

Class - 17

Learning: [Oscillators]

} is an electronic circuit that generates a repetitive, periodic signal, usually in the form of a sine wave, square wave or other waveform.

④ RC oscillators (Resistor - Capacitor)

⑤ LC oscillators (Inductor - Capacitor)

⑥ Crystal oscillators.

Class - 18

Learning: DC and Brushless DC motor + ESC.

(BLDC) ↑

Electronic
Speed controller.

BLDC:

Communication: Electronic (via ESC)

Maintainance: Low maintainance

Efficiency: higher.

Lifespan: Longer

Noise: Quieter.

④ ESC acts as a Brain of BLDC.

Class-19

I²C

Learning: I²C and how to use it.

I²C (Inter Integrated Circuit) ~~+ bus~~ SDA T

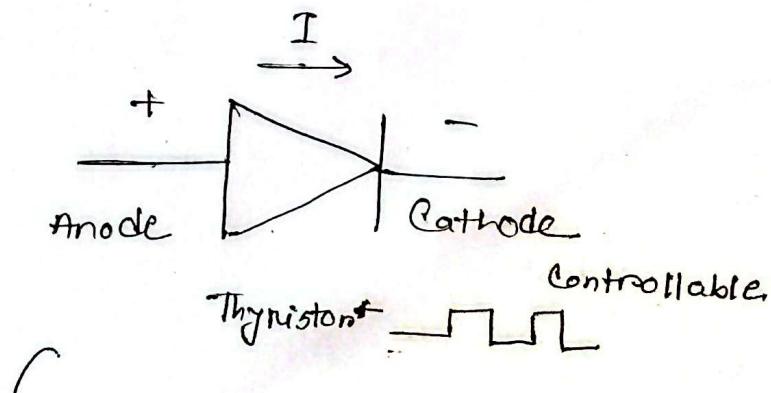
I²C is a serial communication protocol that allows multiple devices (sensors, displays, modules) to communicate with a microcontroller using only 2 wires:

1) SCL (Serial Clock Line) - for clock signals.

2) SDA (Serial Data Line) - for data transfers.

Class-20

Learning: Thyristor, Triac, phase angle control.



→ Semiconductor device that acts like a Controllable diode.

⑩ Phase Angle Control \rightarrow control of power delivered to an AC load.

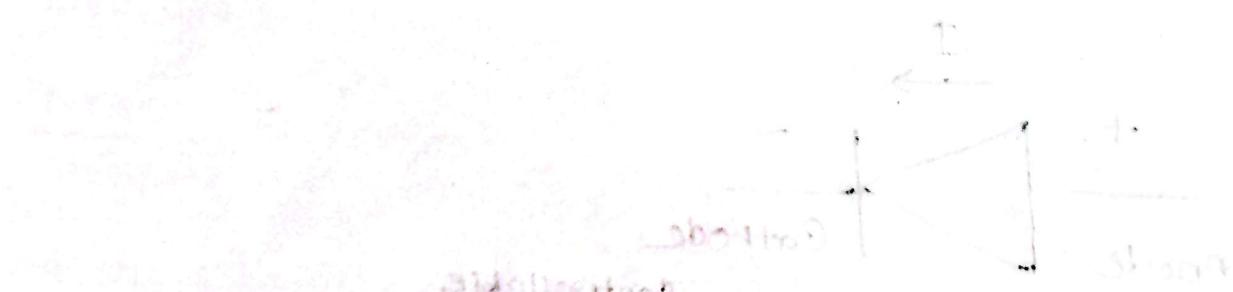
TRIAC (Triode for Alternative Current)

Two of four main terminals joined to a $3^{\circ}\Omega$ p-n-p junction with common ~~emitter~~ cathode connection
and two other terminals with other three junctions
(anodes)

Forward anode (leftmost pair) 180°
reverse anode (rightmost pair) 180°

Forward current I_F \rightarrow 0.00010

reverse current I_R \rightarrow 10^{-10}



Half bridge