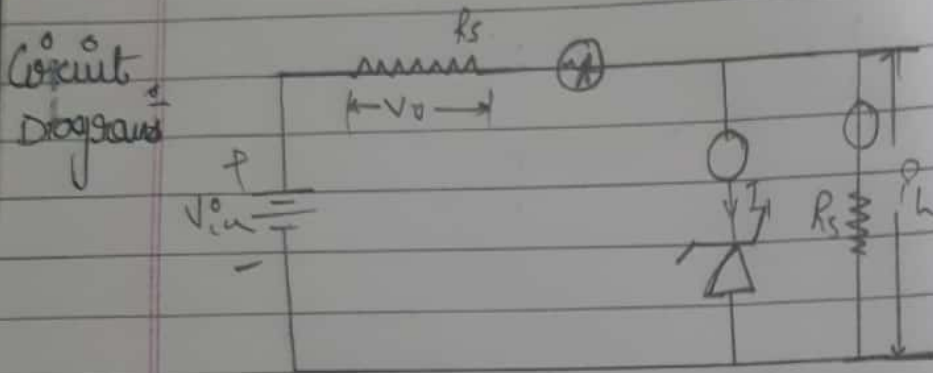


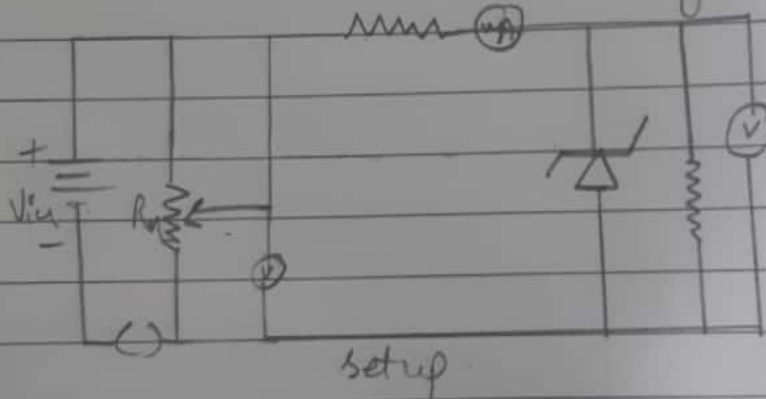
(b) ZENER DIODE AS Voltage Regulator.

Aim: To Construct a Zener diode Voltage regulator & measure its line & load regulation.

Apparatus: Zener diode, resistor, variable DC power supply, milliammeter, voltmeter, Rheostat & wire.



Zener diode shunt regulator.



Formula used: (a) for line Regulation

$$\% \text{ of line Regulation} = \frac{\Delta V_o}{\Delta V_{in}} \times 100$$

(b) for load regulation.

$$= \frac{V_{NL} - V_{FL}}{V_{NL}} \times 100$$

given: Series resistance = 600Ω
 Load resistance = 17000Ω

Line Regulation -

Table 1: S.no	V_{in} V	V_o in V	R_{load} (R_L)
1	0	0	1000
2	1.19	1.15	900
3	2.38	2.29	800
4	3.56	3.43	700
5	4.74	4.57	600
6	5.92	5.59	500
7	7.10	5.596	400
8	8.28	5.597	300
9	9.51	5.598	200
10	10.75	5.599	100
11	12	5.6	0

Calculation: $I_{max} = \frac{\text{Power}}{\text{Zener Voltage}}$

$$I_s = \frac{V_s}{R_s}$$

$$V_1 = \frac{R_s \cdot V_{in}}{(R_s + R_L)} ; V_L = \frac{R_L \cdot V_{in}}{(R_s + R_L)}$$

$$I_L = \frac{V_L}{R_L}$$

$$I_z = I_s - I_L$$

$$V_s = V_{in} - V_L$$

$$V_L = V_2$$

Load Regulation

Table 2:

S.no	$R_L (\Omega)$	$V_o (V)$
1	1000	5.6
2	900	5.6
3	800	5.6
4	700	5.6
5	600	5.6
6	500	5.6
7	400	5.6
8	300	5.6
9	200	4.8
10	100	3
11	0	0

Results:

(a) Line Regulation =

$$= \frac{5.6 - 1.177}{12 - 1.19} \times 100$$

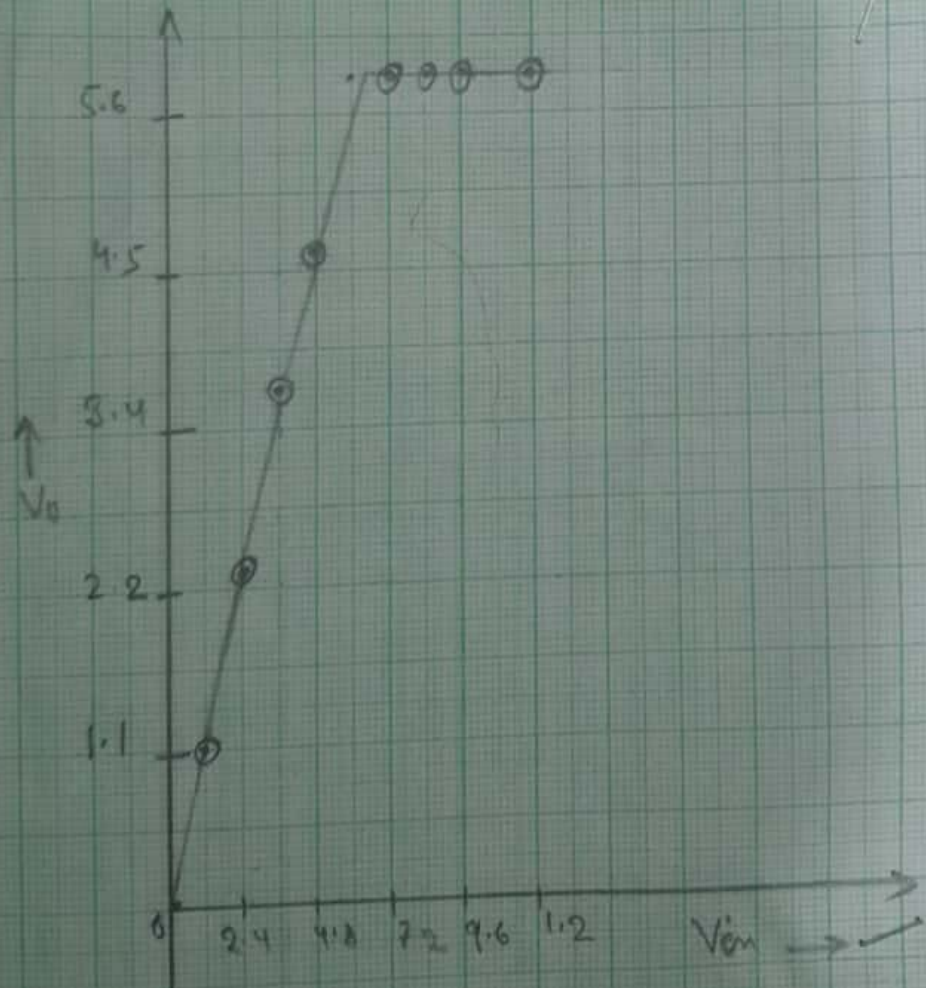
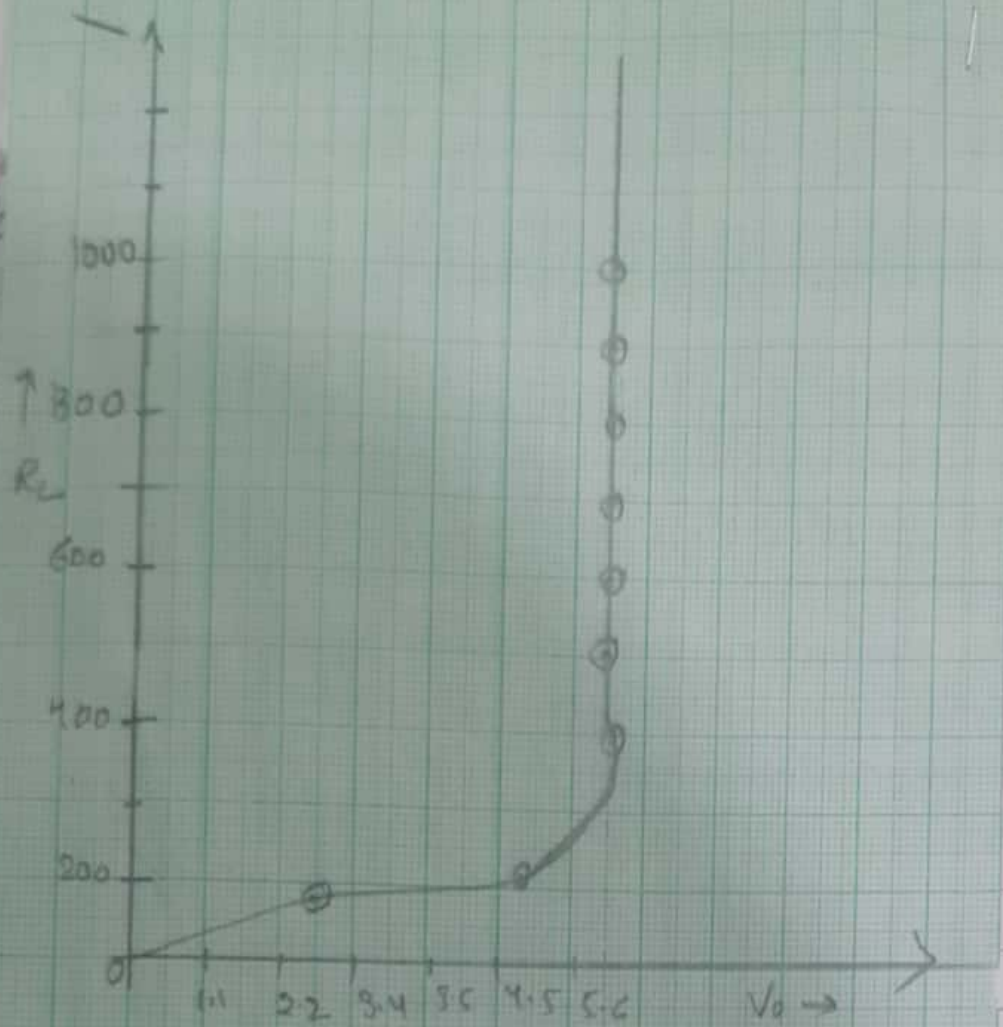
$$= 40.91$$

(b) Load Regulation

$$= \frac{5.6 - 4.8}{5.6} \times 100$$

$$= 14.28$$

GRAPH



Precautions - 1. check connection properly
2. Note down readings properly

Sources of Error - 1. Calculation may be incorrect
2. units may not be taken properly
3. Connection must not be proper