EEE Digital Assignment

Regulated Power Supply using Zener Diode

Name: Om Ashish Mishra

Registration Number: 16BCE0789

Slot: L10+L11

Batch: 10(B-Tech Computer Science (Core))

Regulated Power Supply using Zener Diode

AIM:

Setup a power supply using Zener Diode as voltage regulator

APPARATUS REQUIRED:

- Connecting Wires
- Zener Diode(Z5.1)
- Variable power supply(0-12V)
- Resistance of 330Ω and 1kΩ
- Voltage of 0-10 mV

CIRCUIT DIAGRAMS:

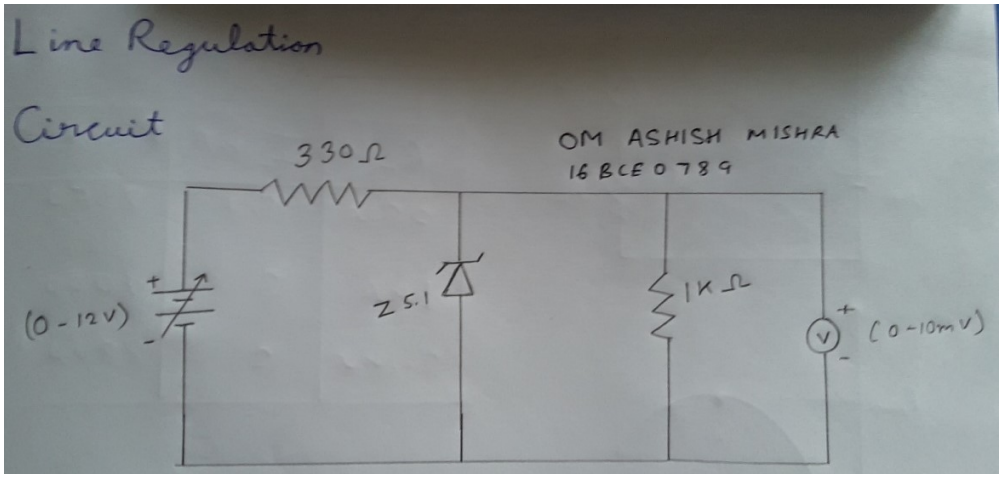


Fig: Line Regulation

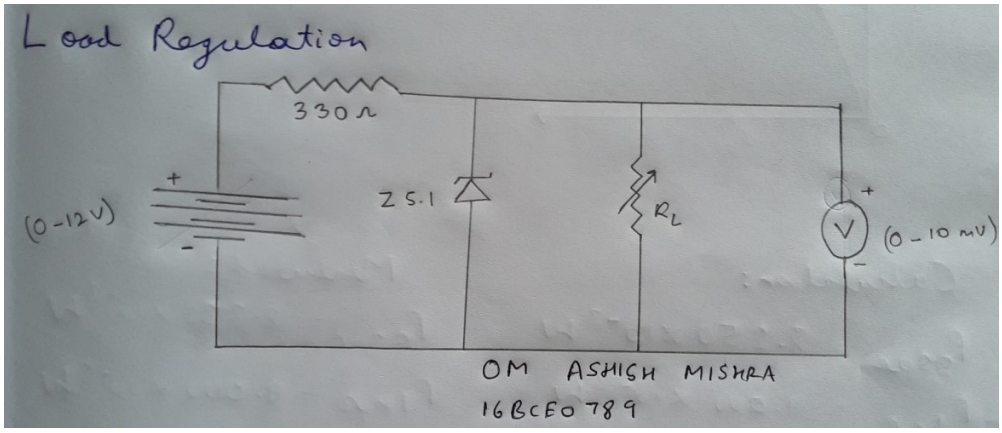
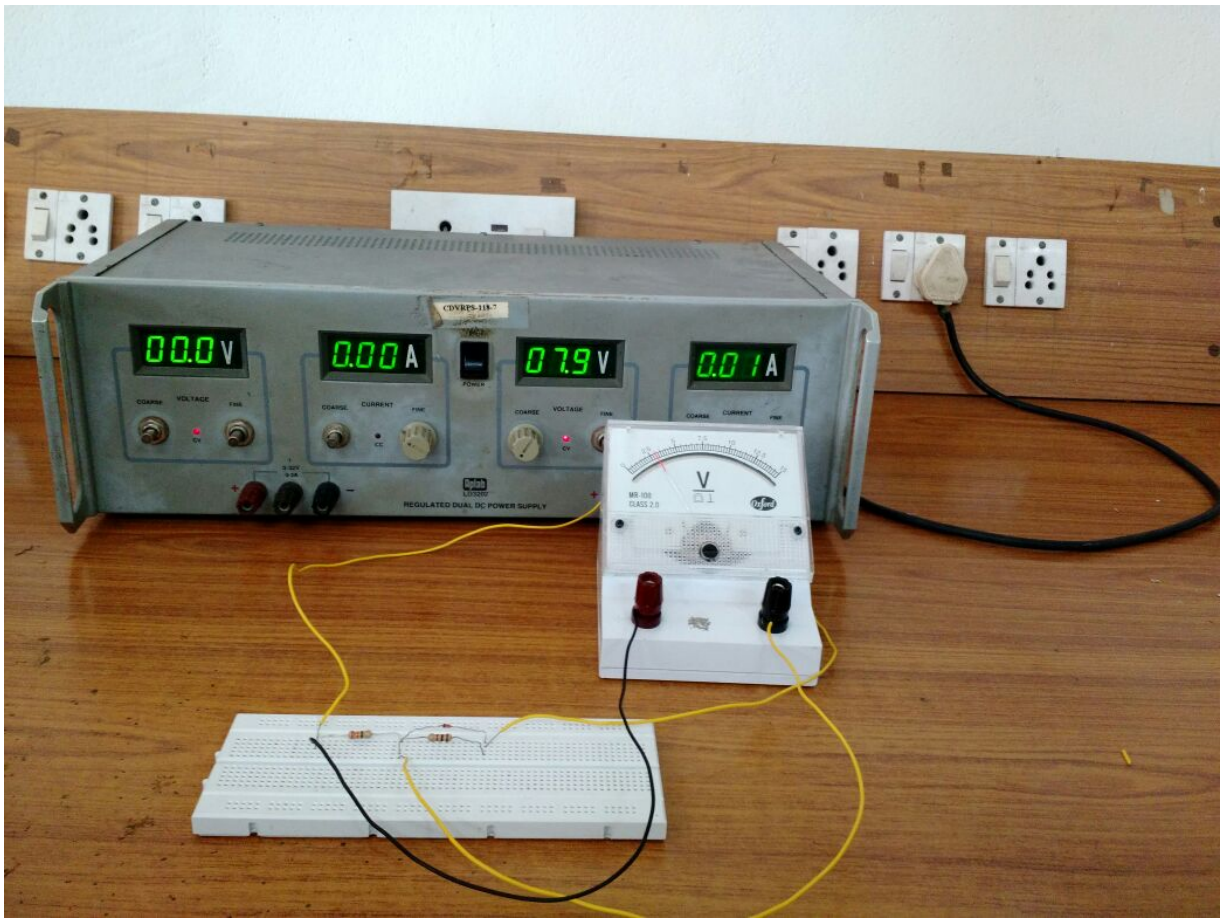
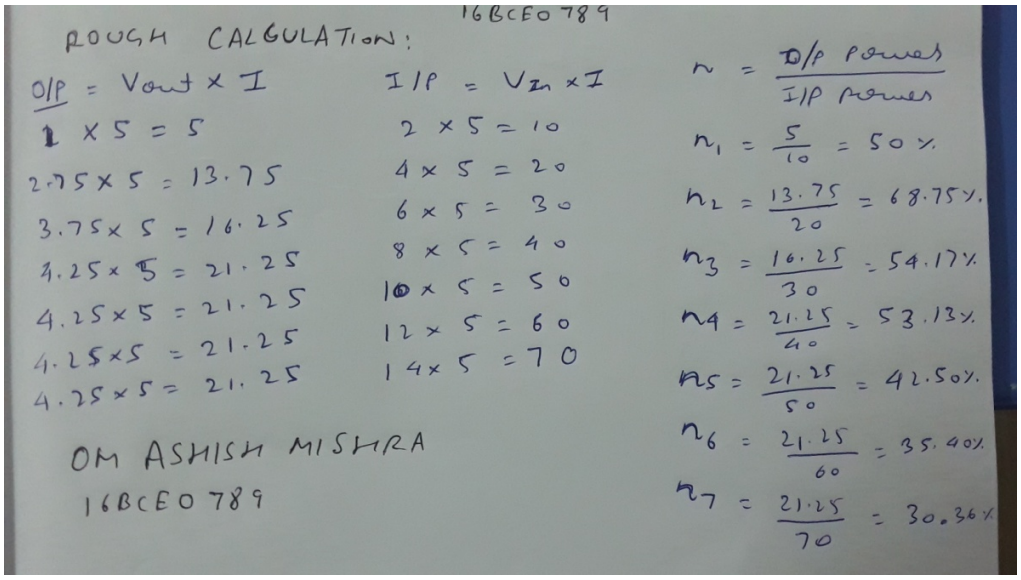


Fig: Load Regulation

PICTURE OF BREADBOARD CONNECTION:



MANUAL CALCULATION(S) / ROUGH WORK:


16BCE0789

ROUGH CALCULATION:

O/P = Vout × I

1 × 5 = 5

2.75 × 5 = 13.75

3.75 × 5 = 16.25

4.25 × 5 = 21.25

4.25 × 5 = 21.25

4.25 × 5 = 21.25

4.25 × 5 = 21.25

I/P = V_{in} × I

2 × 5 = 10

4 × 5 = 20

6 × 5 = 30

8 × 5 = 40

10 × 5 = 50

12 × 5 = 60

14 × 5 = 70

η = O/P power / I/P power

$\eta_1 = \frac{5}{10} = 50\%$

$\eta_2 = \frac{13.75}{20} = 68.75\%$

$\eta_3 = \frac{16.25}{30} = 54.17\%$

$\eta_4 = \frac{21.25}{40} = 53.13\%$

$\eta_5 = \frac{21.25}{50} = 42.50\%$

$\eta_6 = \frac{21.25}{60} = 35.40\%$

$\eta_7 = \frac{21.25}{70} = 30.36\%$

OM ASHISH MISHRA

16BCE0789

GRAPH:

No graph is done for this experiment.

TABULATIONS:

Line Regulation:

Vin (V)	Vout (V)	V330Ω (V)	I(KEPT CONSTANT)(mA)	O/P (mW)	I/P (mW)
2	1	0.75	5	5	10
4	2.75	1.75	5	13.75	20
6	3.25	2.75	5	16.25	30
8	4.25	3.75	5	21.25	40
10	4.25	4.75	5	21.25	50
12	4.25	5.5	5	21.25	60
14	4.25	7	5	21.25	70

η=((o/p power)/(i/p power))

η1	50%
η2	68.75%
η3	54.17%
η4	53.13%
η5	42.50%
η6	35.40%
η7	30.36%

Load Regulation

R(Ω)	V_0(V)
1000	4.25
2200	4.25
10000	4.25

INFERENCE / RESULT:

In this type of regulation, input voltage is fixed and the load resistance is varying. Output volt remains same, as long as the load resistance is maintained above a minimum value.