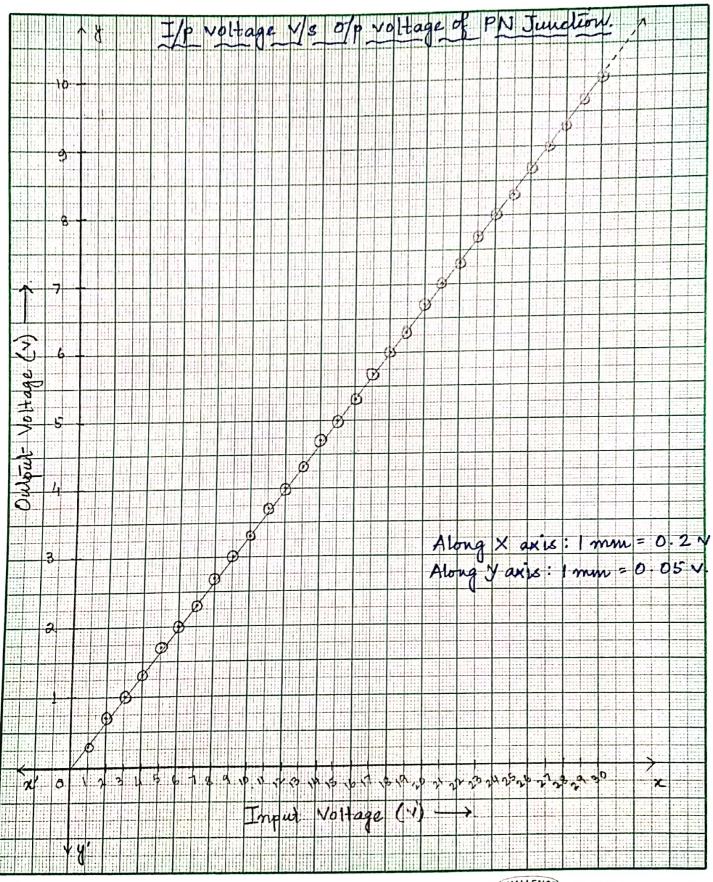
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| 1 | ABHISHEK SHARMA. |
| - | Department of Compuler Science and Engineering. |
| i | THIRD YEAR |
| - 1 | SECTION - 'I' |
| 1 | SECTION - 1 |
| - | ROLL NO.: 01 |
| 20000 | ENROLLMENT NO. : 12019009001127. |
| | 1 |
| E- | ANALOG ELECTRONICS CIRCUIT LAB. |
| ĺ | |
| | ASSIGNMENT - 2. |
| | (Experiment No.: 02) |
| - | (EA) SSME |
| - | Date: 06.08.2021. |
| - | Jan - 06. 08. 001. |
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| _ | University of Engineering & Management, Kolkata. |
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| Ev | periment No.: 2. |
|-------------|--|
| ~~ | periment No.: 2. |
| | e: Study of Zener Diode as a voltage Regulator. |
| Air | and to plot its line and load regulation characteristics. Also, we are going to implement PN Junction diade and compare the line and load regulation with the corressponding zener diade. |
| | EDTURS Spootading ZHIZE INDICE. |
| | paralus Required: -(i) PN Junction Diode |
| - duestine. | (iii) DC power source. (iv) Resistors (series and load) |
| | (v) voltmeters. (vi) connecting wires. |
| | (vi) connecting weres. |
| 9 | 154. 154.) \$ (1-1m/2.0) |
| Pr | ocedwie: - To make this experiment happen the following |
| <u> </u> | Place the apparatus in the proper places as per the circuit diagram and connect the apparatus using the connecting |
| (B) | After plains the apparatus the volt meters and ammeter |
| | f required) are placed in the proper positions for taking readings from the circuit. |
| <u> </u> | Save the circuit, and then run the simulation for the |
| | Make the tables with required parameters and plot the |
| <u> </u> | raphs for PN Junction diode and Zener diode in both |
| 9 | raphs for FN successive about the second states |
| | ses for line and load regulation. |
| | Analyze the graph and from that conclusion and |
| 0 | oservation will be provided. |
| | 1000 |
| | Me manage of the |
| <u>\</u> | (1-100km) |
| | |
| | |

| Circuit Diagram :- | S & not I remove you |
|---|-----------------------------|
| 1) PN Junction Diode for Line reg | alation :- halo a allie |
| Falchier fands skriveres out | (V) voltmeter (NO) |
| entitationale a thehom 100-12 les mis | atilitata at han |
| DC Z (Vi) Diod | e } son |
| Source Source | - p d massimas |
| 2 PN Junction Diode for load ne | gulation 2- |
| Rs. | (V) voltage and covered. |
| 100-0 | |
| power Tisv. | de { / RL { (1-100 k-12) |
| form of the sale of the property and | Lada and a commence of the |
| as there all an account a common to | to blace the apparents i |
| 3 Zener Diode for line regulation : | |
| 100 D | Voltmeter (Vo) |
| DC 7(Vi) Zen power # (0-30V) | er & RL de \$50.0 |
| source T (0-30V) | semberal |
| that at short and 170 story | of wit ill ab a line |
| 4) Zenez Diode for load Regulation | has wait into the |
| $\begin{array}{c} \\ \\ \\ \\ \\ \end{array}$ | IL VL and IL |
| De poroen VI Zener diode | |
| | |

| Circuit Simul | ation using Mut | الأرام في المراجعة | 500 Z 2002 |
|--|--|--|--|
| | 9 | | |
| DPN Junction: | Diode for Line R | egulation: "- | |
| 1 | | | |
| Carlo Carlo | 17 4 | • 4 A A | (V) voltmeter |
| | Rs | -1.00 - IL | (V) Voltailee |
| | 100 T | 1.7 | (V L) . |
| | rtust. | V 12 | |
| A Vo | | Diode & R | 15 7971 |
| ~ | -30V) | \$ 5 | 50-12 |
| power T | | 5V | |
| Source | | | Ţ |
| | | | |
| | = 0 | round | |
| | • | | |
| Observation to | able :- | 1 1 (10k - | 17/10 x 27/20] |
| | | | |
| 1) Table for Li | re Regulation of | PN Junction de | ode |
| | - | | |
| | Oulput Volt (Vo) | · · | |
| OV | δV | 16 V | 5.33 V |
| I V | A 22.1 | | |
| 2 V | 0.33V | 17 V | 5.67 v |
| | 0.67v | 18 V | 5.67 v 6.00 v |
| 1 3 V | 0.67v 1.00v | 18 V | 5.67 v 6.00 v 6.33 v |
| V24V | 0.67v 1.00v 1.33v | 18 V 19 V 20 V | 5.67 v 6.00 v 6.33 v 6.67 v |
| 4 V | 0.67v 1.00v 1.33v 1.67v | 18 V 19 V 20 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v |
| 4 V2 5 V2 6 V | 0.67v 1.00v 1.33v 1.67v 2.00v | 18 V 19 V 20 V 21 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v |
| 4 V 5 V 6 V | 0.67v 1.00v 1.33v 1.67v 2.00v 2.33v | 18 V 19 V 20 V 21 V 22 V 23 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v |
| 4 V 5 V 6 V 7 V | 0.67v 1.00v 1.33v 1.67v 2.00v 2.33v 2.67v | 18 V 19 V 20 V 21 V 22 V 23 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v |
| 4 V 5 V 6 V 7 V 8 V | 0.67v 1.00v 1.33v 1.67v 2.00v 2.33v 2.67v 3.00v | 18 V 19 V 20 V 21 V 22 V 23 V 24 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v 8.00 v 8.33 v |
| 4 V2 5 V2 6 V2 V 6 V2 V 7 V2 V 6 V2 V 7 V V | 0.67 v 1.00 v 1.33 v 1.67 v 2.00 v 2.33 v 2.67 v 3.00 v 3.33 v | 18 V 19 V 20 V 21 V 22 V 23 V 24 V 25 V 26 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v 8.00 v 8.33 v |
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| 124V 125V 126V 126V 128V | 0.67 v 1.00 v 1.33 v 1.67 v 2.00 v 2.33 v 2.67 v 3.00 v 3.33 v 4.00 v | 18 V 19 V 20 V 21 V 22 V 23 V 24 V 25 V 26 V 28 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v 8.00 v 8.33 v |
| V 4 V 5 V 6 V 6 V 6 V 6 V 6 V 6 V 6 V 6 V 6 | 0.67 v 1.00 v 1.33 v 1.67 v 2.00 v 2.33 v 2.67 v 3.00 v 3.33 v 4.00 v 4.33 v | 18 V 19 V 20 V 21 V 22 V 23 V 24 V 25 V 26 V 28 V 29 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v 8.00 v 8.33 v 9.00 v 9.33 v |
| 4 V 5 V 6 V 7 V V 8 V V 9 V V 10 V V 11 V V 11 V | 0.67 v 1.00 v 1.33 v 1.67 v 2.00 v 2.33 v 2.67 v 3.00 v 3.33 v 4.00 v | 18 V 19 V 20 V 21 V 22 V 23 V 24 V 25 V 26 V 28 V | 5.67 v 6.00 v 6.33 v 6.67 v 7.00 v 7.33 v 7.67 v 8.00 v 8.33 v 8.67 v 9.00 v |

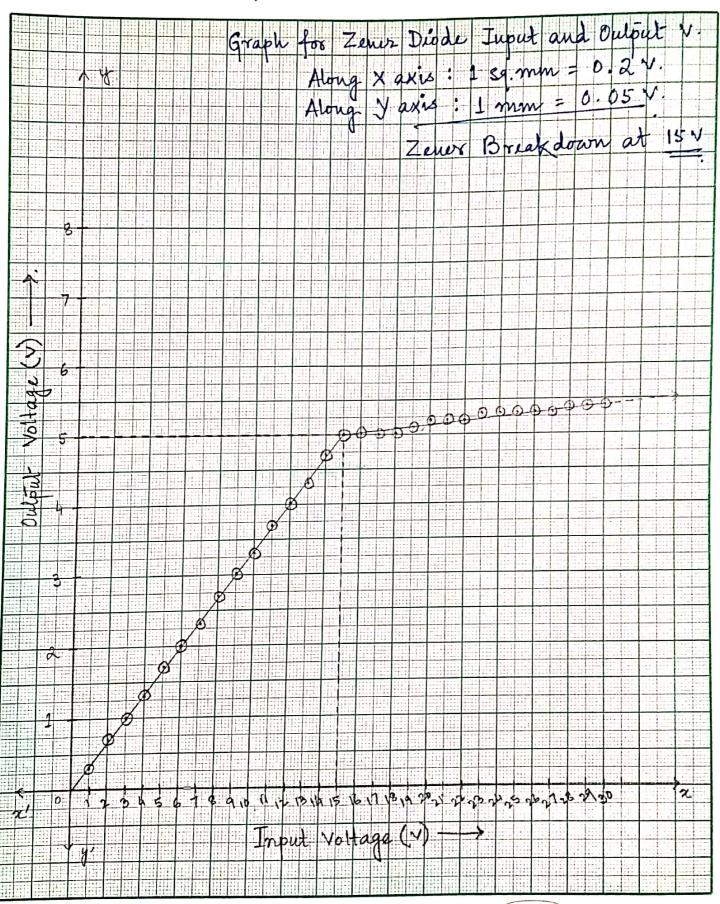


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CHALLENGE Graph Paper - M. M. Division

| 2 Zener Diode | e of line negu | dation is unto h | Cimuil Simi |
|---------------------|---------------------------------------|------------------|--------------------|
| | 7 | | |
| | Kegulalions & | Dirds for line | W PN Junetiny |
| | Rs | | (V) Voltmeter |
| (N) voltmuss | | → Iı | (V ₀). |
| when (A) | T. (00) | JIz. | |
| - 14.5 | 7. | 4-00 | |
| DC 7 | Vcc | Zener. | |
| power I (o | -30v)6min | <u> </u> | RL |
| source. | | 5 | DC AOS |
| | , 9 | | 3 |
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| | · komerce | • | |
| | | | |
| Observation 4 | table: | - 1 - 1 - 1 | Discontinu |
| | · · · · · · · · · · · · · · · · · · · | | |
| (a) Table for the | re output volta | age and input vo | Hage for zener 3- |
| (a) (a) (b) (v) (a) | Vout (V) | Viw (V) | Nout (N) |
| VOOV | 0 V | 167 | 4.99V |
| 10 | 0.33V | 2 (7 V.) | 5.00V |
| vocav | 0.67V | IB V | 5.00 V. |
| V 853V | 1.00 V | 19~ | 5.01V |
| 104N | 1.331 | vaiv | 5.02 V |
| V 0 5V | 1.67N | 21 V | 5.02 V |
| V 68 6V | 2.00V | · aav | 5.02 V |
| VVE 7N | a.33v | 237 | 5.03V |
| V 00.8V | 2,67V | 24 V | 5.03V |
| VES 90 | 3.00V | 25 V | 5.03V |
| VOICT | 3.337 | 264 | 5.03V |
| V GTO IN | 3.671 | 27V | 5.04V |
| · 86 12V | 4.00 V | 281 | 5.04v |
| 13V | | | 3.041 |
| 1 4 4 4 10 1 | | | |
| 400.14V | 4.33V | 30V. | 5:04V 5:04V |

Abhishek Sharma | CB - 31 - 01.



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| 1 | 6 7 50 | > \ | ١ , , | A-* | | 1 | | |
|----|--------------|---|--------------|-----------------|---------------|---------------|--|--|
| | 3 Zener Di | ode for 1 | oad Regula | lion :- | -3 waisu | | | |
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| | ad dod . | art ded was read 100-2 his wall liver | | | | | | |
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| | a de sel | Vcessor | maid + line | zener. | 57 RL | its Ha | | |
| | DC = | = 15V. haic | | e Anilalia | /\$(1K12-10 | 10 K-2) | | |
| 3" | power source | of daida | routing i | 5V | a morals | parte | | |
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| | turner bear | 9111 00 | o he come | Laureman | 2071+12 | 601 | | |
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| 32 | Talalupos | | 1 1 | 15 1. H | Luly mar in | 636 00 | | |
| | | | | | | | | |
| | Obcervation | Observation Table: | | | | | | |
| | | 3) Table for VL, IL and RL for the zener diode (load regulation): | | | | | | |
| | (3) Table to | r VL, ILO | ind RL for - | the zener d | iode (load | regulation) à | | |
| | | | | | VL(V) | IL (ma). | | |
| | RL (K-D) | V _L (N) | IL (mA) | RL(K-D) | 5 | 0.10 | | |
| | 1 | 5 | 5.0 | 50 | 5 | 0.09 | | |
| | 4 | 5 | 1.3 | 54 | | 0.088 | | |
| | 7 | 5 | 0.7 | 57 | <u>5</u> 5 | 0.083 | | |
| | 10 | 5 | 0.5 | 60 | 5 | | | |
| | 14 | 5 | 0.4 | 64 | | 0.078 | | |
| | 17 | 5 | 0.3 | 67 | 5 | 0.075 | | |
| | ao | 5 | 0.3 | 70 | 5 | 0.071 | | |
| | 24 | 5 | 0.2 | 74 | 5 | 0.068 | | |
| | 27 | 5 | 0,18 | 77 | 5 | 0.065 | | |
| | 30 | 5 | 0.16 | 80 | 5 | 0.062 | | |
| | 34 | 5 | 0.14 | 84 | 5 | 0.059 | | |
| | 37 | 5 | 0.13 | 87 | 5 | 0.057 | | |
| | 40 | 5 | 0.12 | 90 | 5 | 0.055 | | |
| | 44 | 5 | ٥. ١١ | 94 | 5 | 0.053 | | |
| | 47 | 5 | 0.10 | 97 | 5 | 0.054 | | |
| | • | | | 100. | 5 | 0.050 | | |

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Abhishek Sharma I CS

JI - 01

| After deploying all the required graphs and taking all the required madings we can clearly state that. Zenen diode is corolling as a voltage regulator. From the line regulation of PN Junction Diode we have seen that the input and ordiful voltage are proportional to each other and forming a straight line passing through 0. For the line regulation of Zoner Diode, we saw the breakdorn in the ordiful voltage, which is coly zener diode works as a voltage regulator. After that, from the load regulation we have seen that ordiful voltage or load voltage remains to be same as the load current increases and making curve parallel to x-axis. Hence, we can conclude that. Zener Diode as Voltage Regulator. | | | | | | | /. |
|--|-------------|--|--|--|---|--|--|
| After deploying all the required graphs and taking all the required medialize we can clearly stale that. Zener diode is working as a voltage regulator. From the line regulation of PN Junction Diode we have seen that the input and output voltage are proportional to each other and forming a straight line possing through 0. For the line regulation of Zener Diode, we saw the break down in the output voltage, which is why zener diode works as a voltage regulator. After that from the load regulation we have seen that, output voltage or. load voltage remains to be same as the load current increases, and making curve parallel to x-axis thence. We can conclude that. Zener Diode as Voltage Regulator. | | Conclu | ision :- | - 3 - 4 - 71 | Jupay Scal | 900 4/-3 | · 1 · 1 |
| Se can conclude that: Zener Diode to Stituy September Septem | | After requires is writed input other for to brush diode Load incre | deploying red reading orking as altion of P and orlif and form he line ru k down in works as regulation voltage ases and | all the required we can a voltage. N Junction of the output of the outp | clearly sine dearly sine with a proper of the same proper of the same wife parall | rand tolder that. From the have see on tional to passing we which is a fler the as the deliberty of the control of the contro | zener diode Zener diode Line n that the co each through O. saw the why zener at, from the voltage ox, load current axis. Hence, |
| Record R | | WL CA | n conclude | that, Zen | o — | a west | or Lesson In |
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| 27 5 0.18 1.77 5 0.15 0.05 0.05 0.05 0.05 0.05 0.05 0. | | | 7 | | | **** | |
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