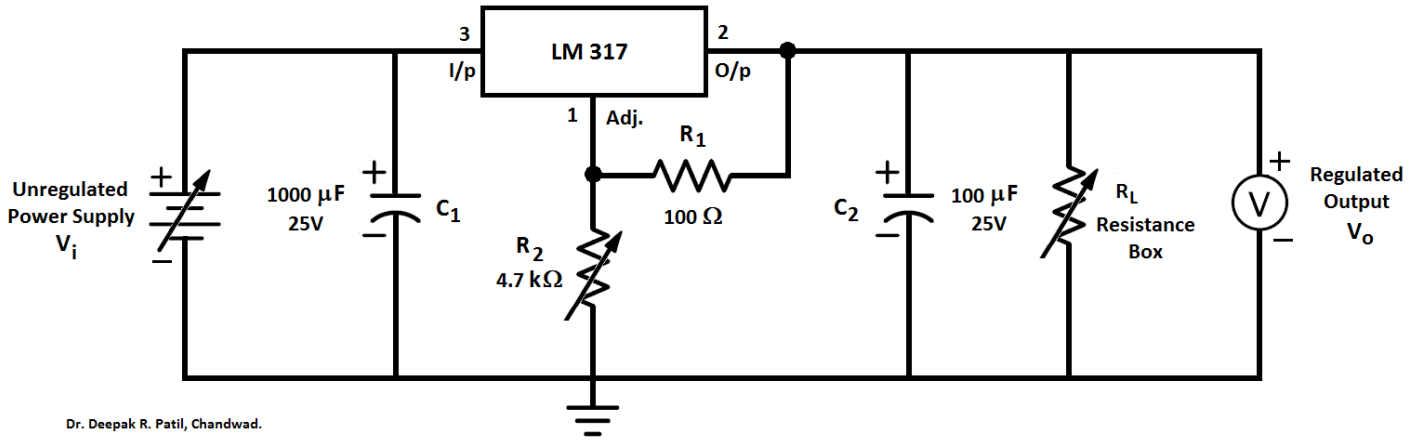
Title: Variable Power Supply using IC 317.

Aim: To study the variable power supply using IC LM317 and its load & line regulation characteristics.

Components: LM 317 (3-Terminal Positive Adjustable Regulator), Resisters (100 Ω, 220Ω), Potentiometer (4.7kΩ), Capacitors (100µF/25V, 1000 µF/25V).

Equipment's and Miscellaneous: Regulated DC power supply (0-25V), DMM, Breadboard, Connecting wires etc.

Circuit Diagram:



Observation Table:

Load Regulation:

$V_i = V_{NL}$ = ...

Sr. No.	Load Resistance (R_L)	Load Voltage, (V_o)	% Load Regulation
1.	∞	.....$V=V_{NL}$	0
2.			
. . .	. . .	. . .	
10.			

Line Regulation:

R_L = ...

Sr. No.	Line voltage, (V_i)	Load Voltage, (V_o)	% Line Regulation
1.		.....$V=V_{HL}$	0
2.			
. . .	. . .	. . .	
10.			

(Leave enough space for observation table in practical book)

Calculations:

1. $V_o = 1.25\left(1 + \frac{R_2}{R_1}\right)$
2. % Load Regulation = $\frac{V_{NL} - V_{FL}}{V_{FL}} \times 100$

Where, V_{NL} = Load voltage with no load current i.e. open circuit voltage.

V_{FL} = Load voltage with full load current. (Any R_L other than ∞ can be treated as full load.)

3. % Line Regulation = $\frac{V_{HL} - V_{LL}}{V_{LL}} \times 100$

Where, V_{HL} = Load voltage with high line.

V_{LL} = Load voltage with low line. (Any V_i other than V_{HL} can be treated as low line.)

(Leave enough space for calculations in practical book)

Result:

1. % Line Regulation = ……
2. % Load Regulation = ……..
3. It is observed that variable power supply using IC LM317 is more sensitive to line change as compared to load change.

(Do not write on Practical Sheet)

Precautions:

1. The applied voltage, current should not exceed the maximum ratings of LM 317.
2. Switch off the power supply after the experiment.
3. Always be careful when reducing load resistance. Reducing R_L means we are going toward short circuit. Avoid Very small R_L.

Procedure:

1. Design the Voltage regulator for fix V_o i. e. for given V_o and R_1, find out R_2.
2. Connect the circuit as shown in the diagram.

For Load Regulation:

3. Keep V_i constant at particular value according to design. (Generally at maximum value).
4. Make output terminal open i.e. $R_L = \infty$, and note down output voltage i.e. V_{NL}.
5. Reduce the R_L in suitable steps and note down V_o.
6. Calculate the % load regulation form observation table.
7. Plot the graph Output Voltage Vs R_L and % Load Regulation Vs R_L.

For Line Regulation:

8. Keep R_L constant at particular value. (Generally at maximum value).
9. Keep V_i at maximum value and note down output voltage i.e. V_{HL}.
10. Reduce the V_i in suitable steps and note down V_o.
11. Calculate the % line regulation form observation table.
12. Plot the graph Output Voltage Vs V_i and % Line Regulation Vs V_i.