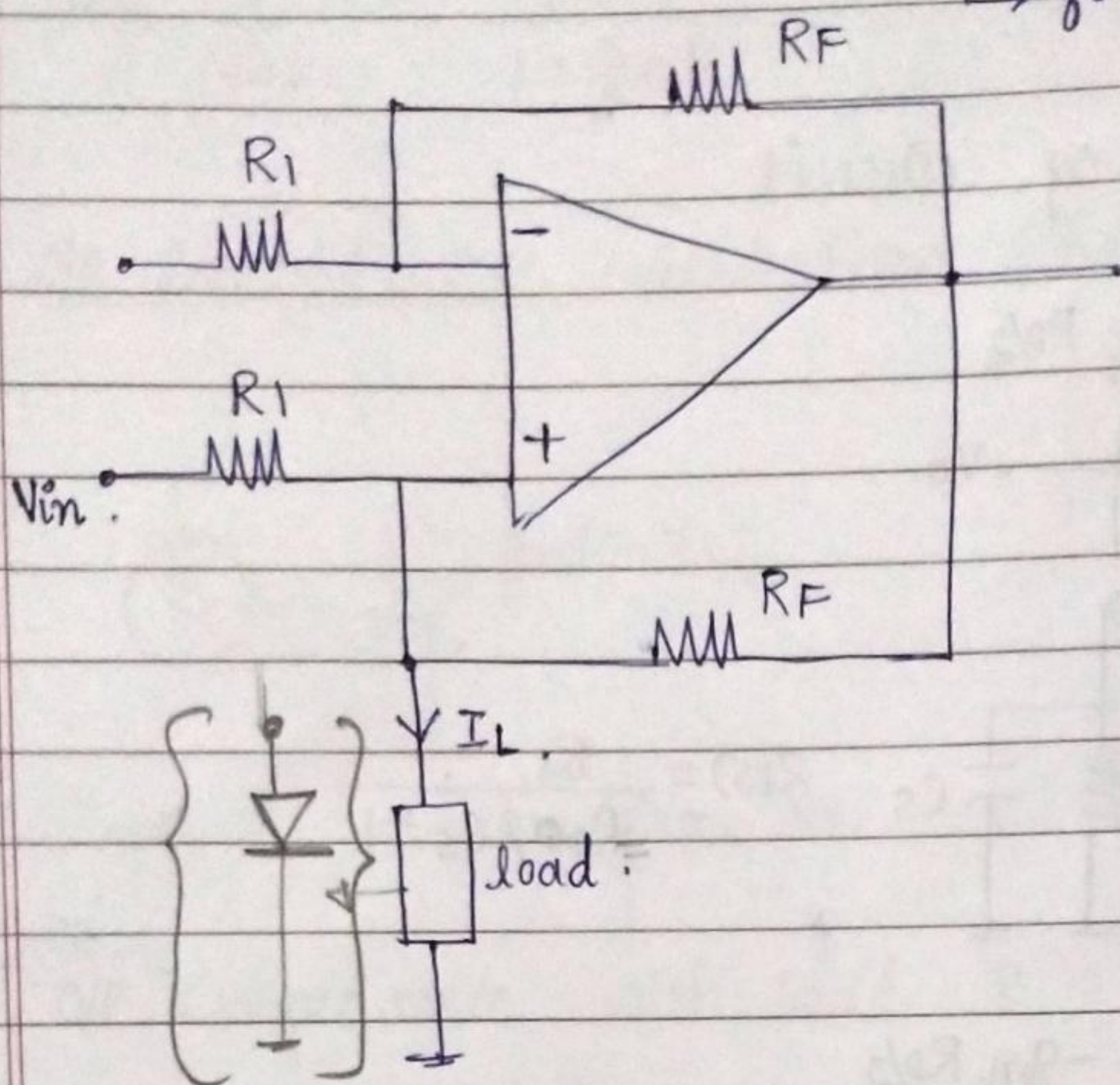


### Part C

(10)

1. Howland current Pump.

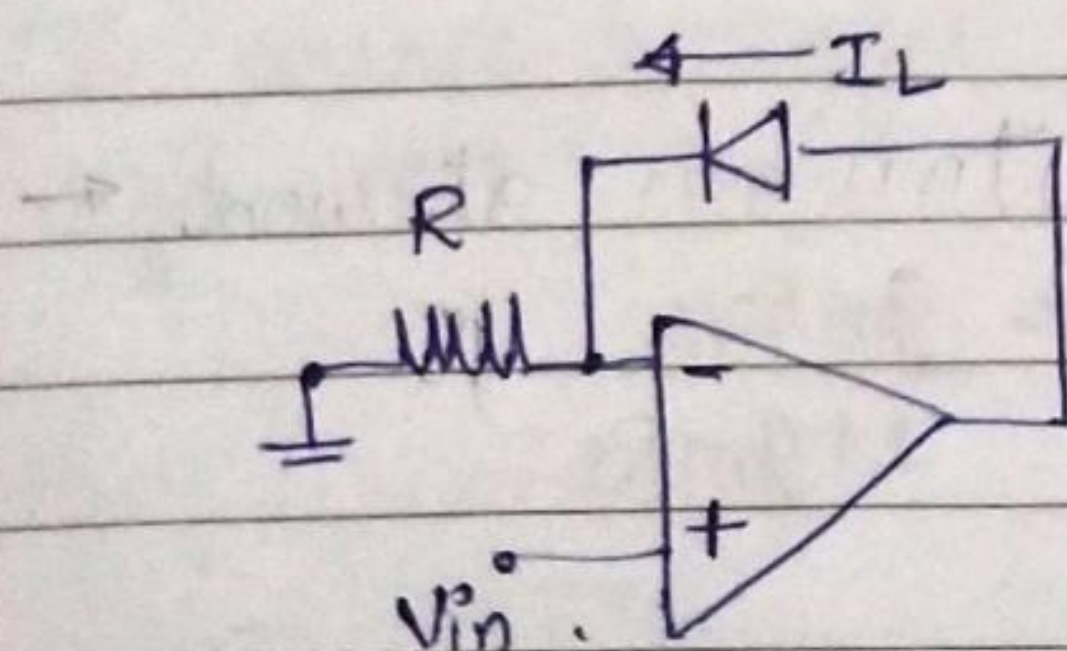
→ for grounded load.



$$\text{current } I_L \text{ through load} = \frac{V_{in}}{R_1} \quad \left[ \text{if } R_F = R_1 \right]$$

with  $R_1 = 1k\Omega$ , varying  $V_{in} : 0 \text{ to } 2V$   
 $I_L : 0 \text{ to } 2mA$ .

OR



→ for floating load.

→ Correct circuit — (5)

→ Explanation of current from different voltages — (5)

### Part D

Netlist — 10

Plots — 10.