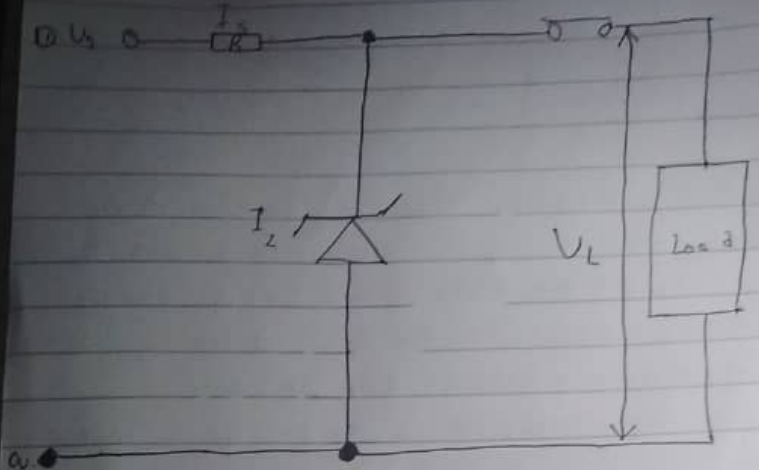

② Maximum watts = 5W

Maximum Current = 500mA

① ⓑ V_S = 27V

V_z = 20V

I_z = 500mA

Minimum value = $\frac{27-20}{500}$ = 0.014

= 0.014 x 1000

= 14Ω

③ Current = $I_L = \frac{V_z}{R_L} = \frac{20}{500}$

= 0.04A

Solution

(b) Zener diodes can be used to produce a stabilised voltage output with low ripple under varying load current conditions. By passing a small current through the diode from a voltage source, via a suitable current limiting resistor (R_s), the Zener diode will conduct sufficient current to maintain a voltage drop of V_{out}.

The function of a Zener diode regulator is to provide a constant output voltage to a load connected in parallel with it in spite of the ripples in the supply voltage or variations in the load current. A Zener diode will continue to regulate it's voltage until the diodes holding current falls below the minimum $I_{Z(min)}$ value in the reverse breakdown region.

(i)