1. A basic LED driver circuit is comprised of a 5 volt source a 2 kohm potentiometer and a LED. The LED is forward biased. The LED manufacturer indicates a maximum current rating of 20 mA at a diode voltage drop of 1.9 volts.

a.) What is the minimum value of resistance the potentiometer can be adjusted to before damage to the LED occurs?

b.) What is the nominal resistance of the LED with this condition?

c.) Draw a schematic diagram illustrating the addition of a component that will protect the LED in the event that the pot is adjusted below a safe level.

Solution

1).

$$\frac{U}{I} = R + \frac{U_{diode}}{I}$$

$$\frac{5}{0.02} = R + \frac{1.9}{0.02}$$

$$R = 250 - 95 = 155\ Ohm$$

2).

$$R_{diode} = \frac{U_{diode}}{I} = \frac{1.9}{0.02} = 95\ Ohm$$

3).