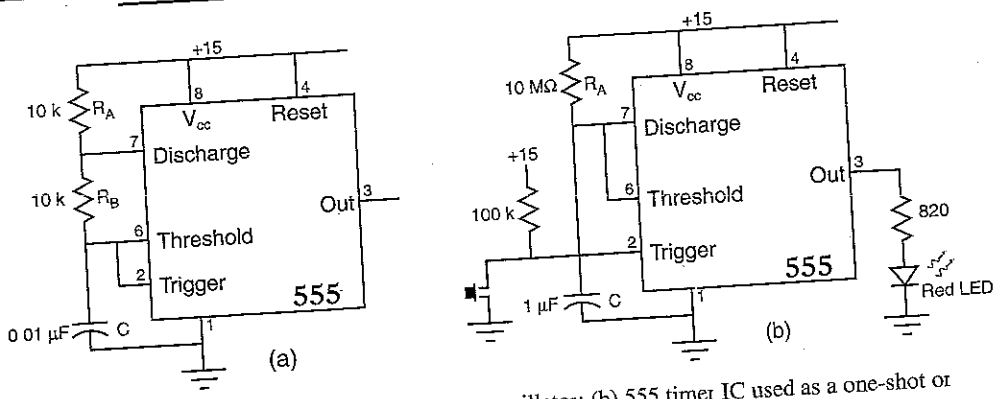

Fig. 9.6. (a) 555 timer IC used as an oscillator; (b) 555 timer IC used as a one-shot or timer.

- ▷ Sketch the output waveform and briefly explain the operation of this circuit. Is the output symmetric? If not, why not?
- ▷ Derive Eq. 9.3 and compare the measured output frequency with the predicted oscillation frequency.
- ▷ Examine the voltage V_C across the capacitor. Record its minimum and maximum values. Do they make sense?
- ▷ Try replacing R_B with a short circuit – what happens? Explain why. Put R_B back for the next part.
- ▷ Try changing V_+ to 5 V and observe how the output changes. To what extent does the output frequency depend on supply voltage?

Now connect a 555 as shown in Fig. 9.6(b). The output should be a 'one-shot' pulse of duration

$$t = 1.1 R_A C. \tag{9.4}$$

The output pulse is triggered by the push-button switch, which causes the TRIGGER input to go to ground. (Note: the output will remain high indefinitely if the TRIGGER input is held at ground, so one should ensure that the trigger pulse is shorter than the desired output pulse!) Time the output pulse by observing the LED.

- ▷ Briefly explain the operation of this circuit. What prevents this circuit from oscillating?
- ▷ Measure the output-pulse duration for several values of R_A and C. Tabulate your results.
- ▷ Derive Eq. 9.4. Are your data consistent with this expression? If not, why not?