ECE 312
Electronic Circuits (A)

Lec. 4: BJT Practical Applications

Instructor

Dr. Maher Abdelrasoul

Outline

- BJT Diode Usage and Protective Capabilities
- Relay Driver
- Light Control
- Maintaining a Fixed Load Current
- Alarm System with a CCS
- Voltage Level Indicator
- Logic Gates

Practical Application
BJT Diode Usage and Protective Capabilities

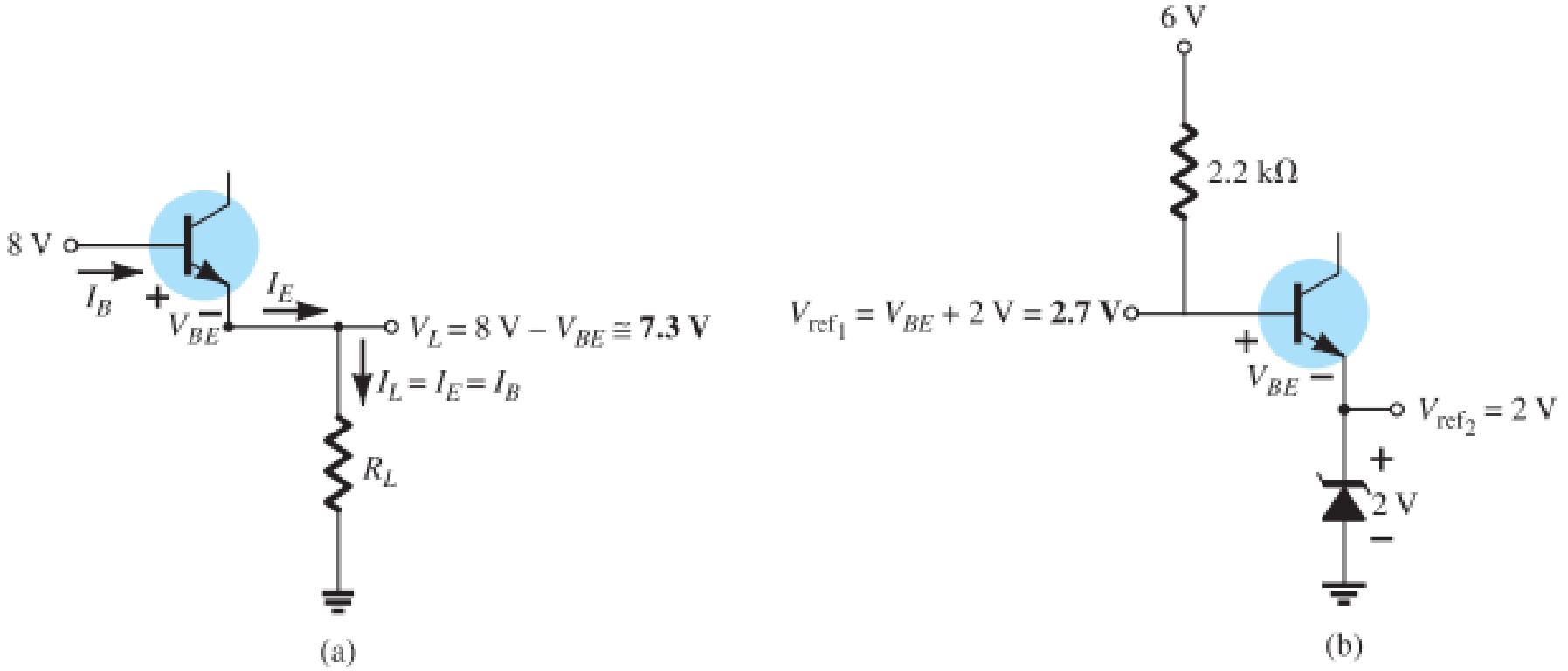


FIG. 4.102

BJT applications as a diode: (a) simple series diode circuit; (b) setting a reference level.

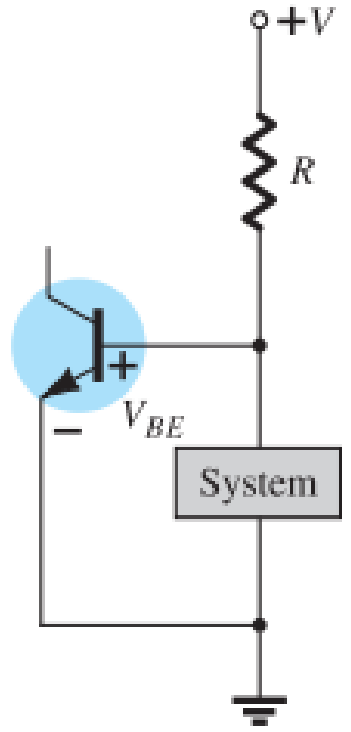


FIG. 4.103

Acting as a protective device.

Practical Application
Relay Driver

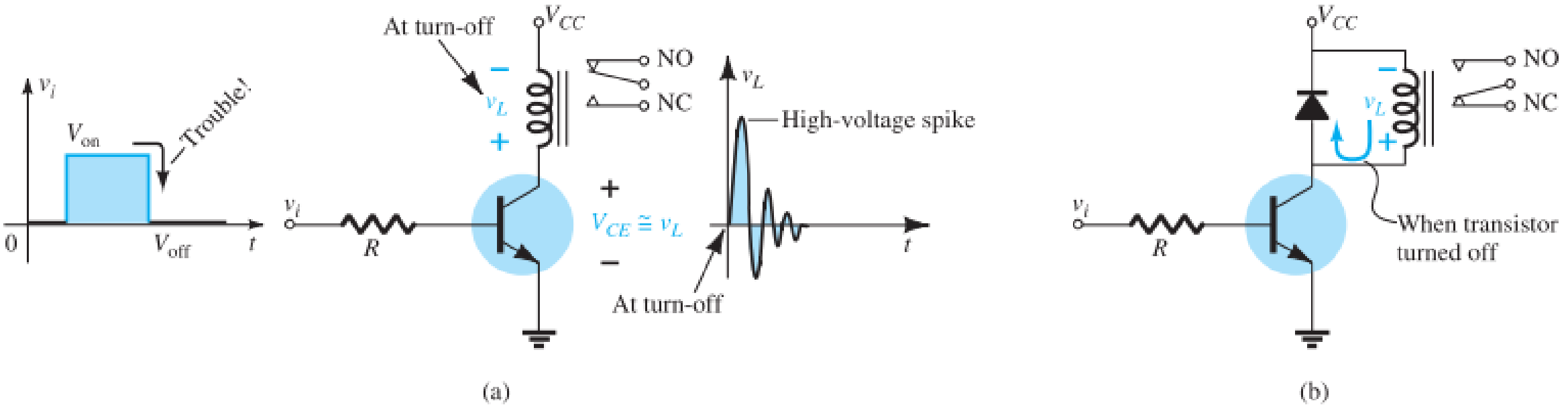


FIG. 4.104

Relay driver: (a) absence of protective device; (b) with a diode across the relay coil.

Practical Application
Light Control

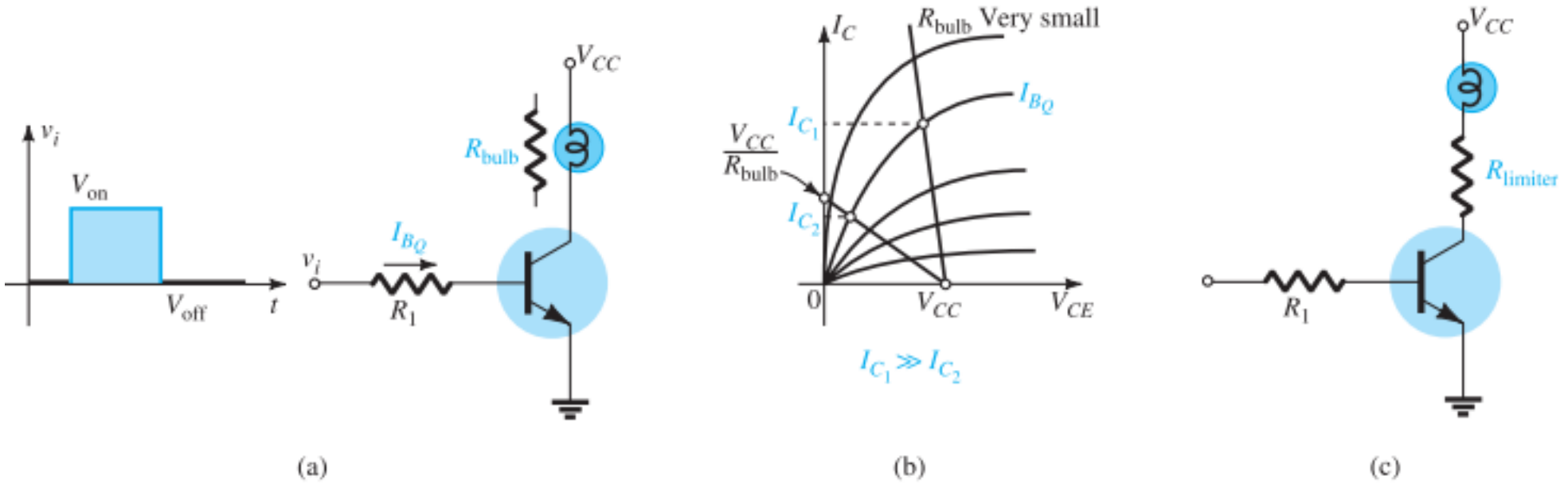
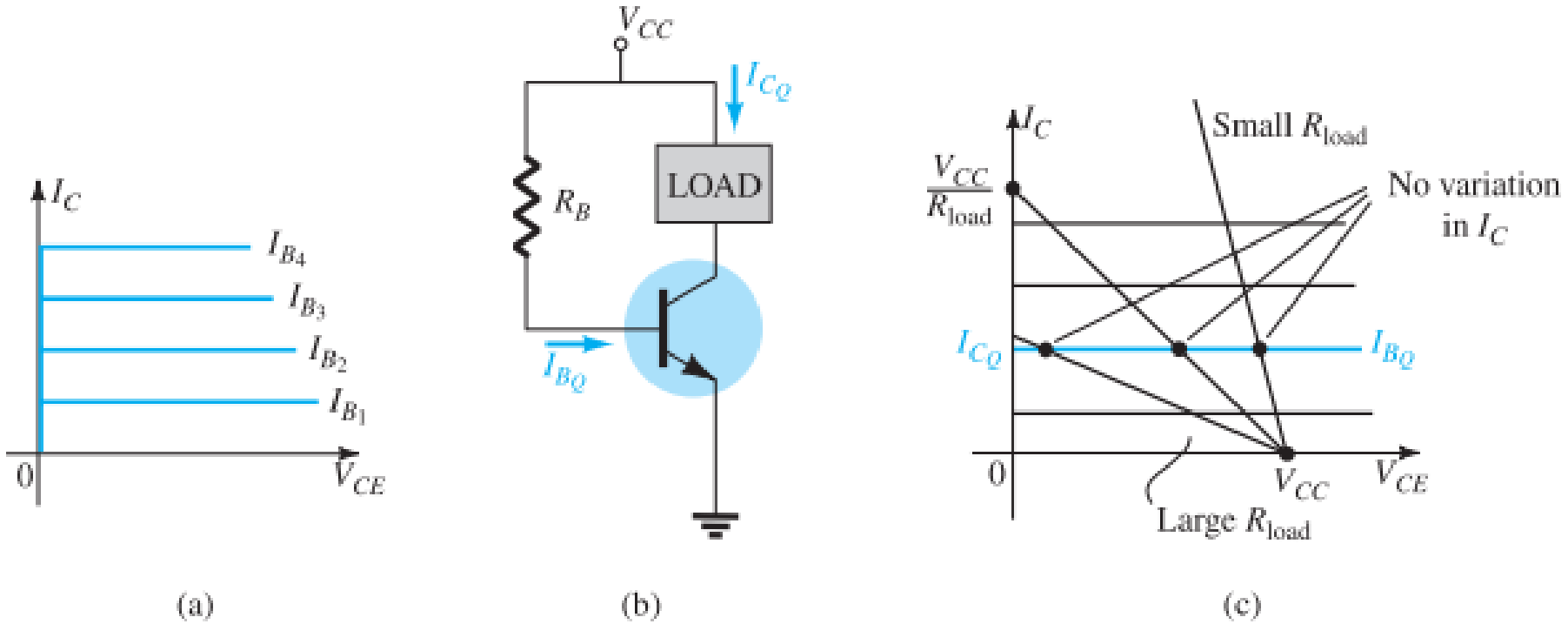


FIG. 4.105

Using the transistor as a switch to control the on–off states of a bulb: (a) network; (b) effect of low bulb resistance on collector current; (c) limiting resistor.

Practical Application
Maintaining a Fixed Load Current



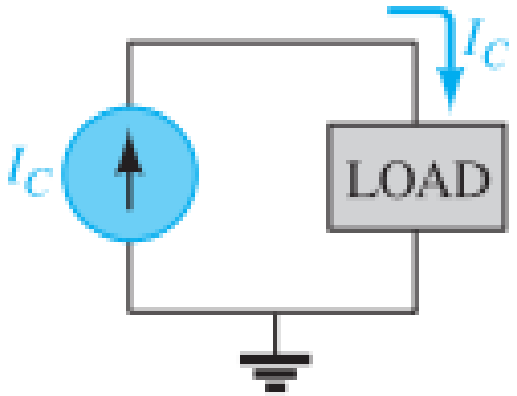


FIG. 4.106

Building a constant-current source assuming ideal BJT characteristics: (a) ideal characteristics; (b) network; (c) demonstrating why I_C remains constant.

Practical Application
Alarm System with a CCS

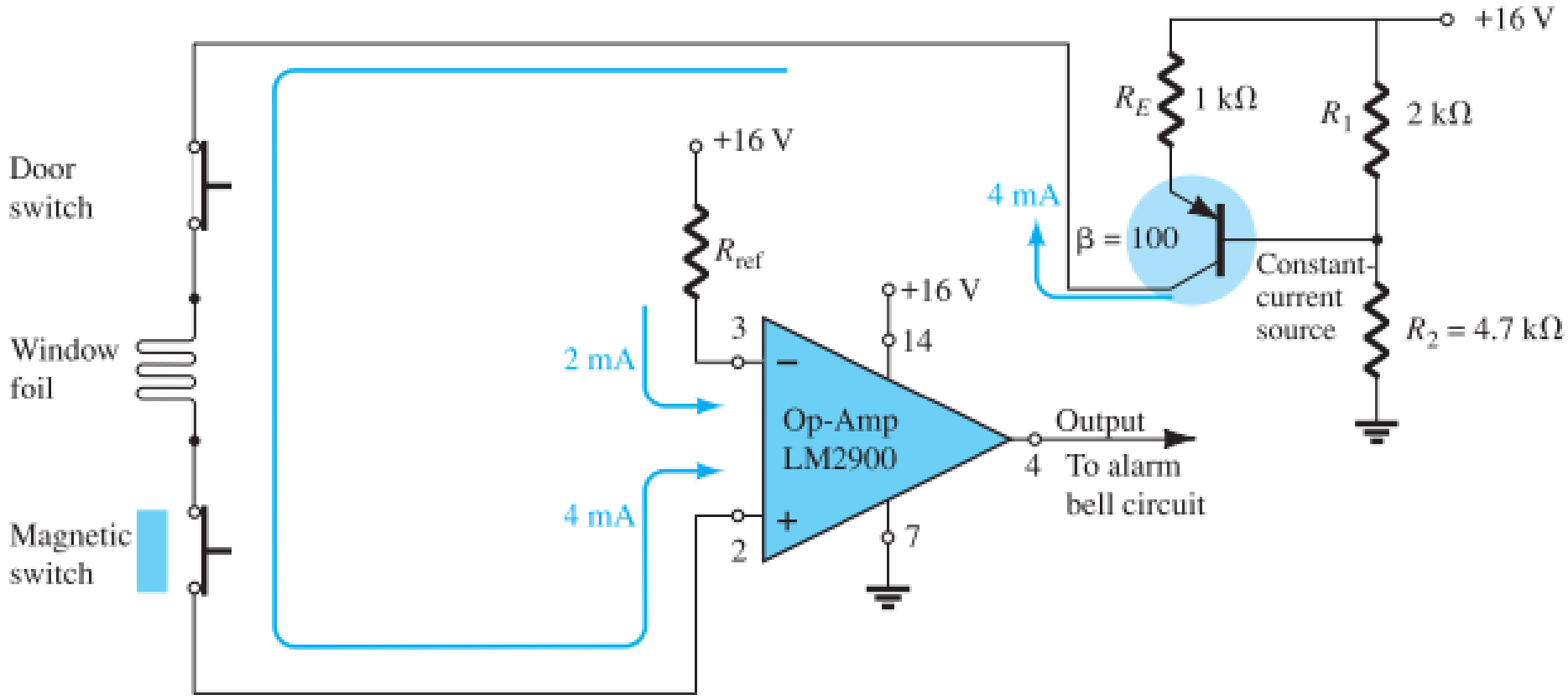


FIG. 4.108

An alarm system with a constant-current source and an op-amp comparator.

Practical Application
Voltage Level Indicator

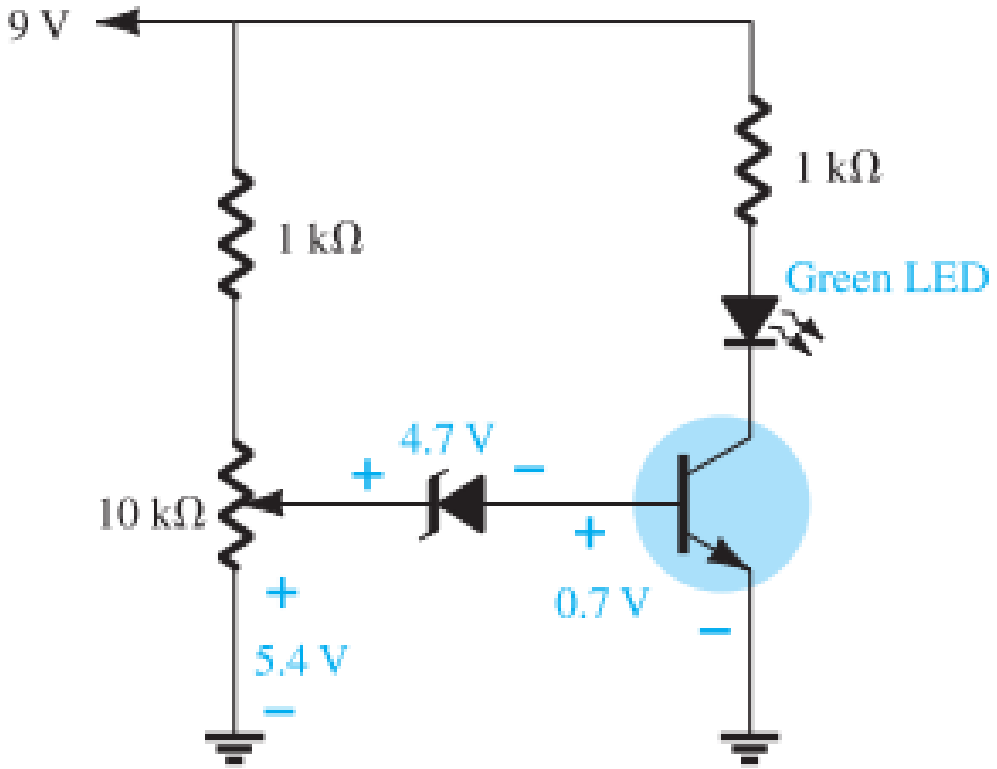
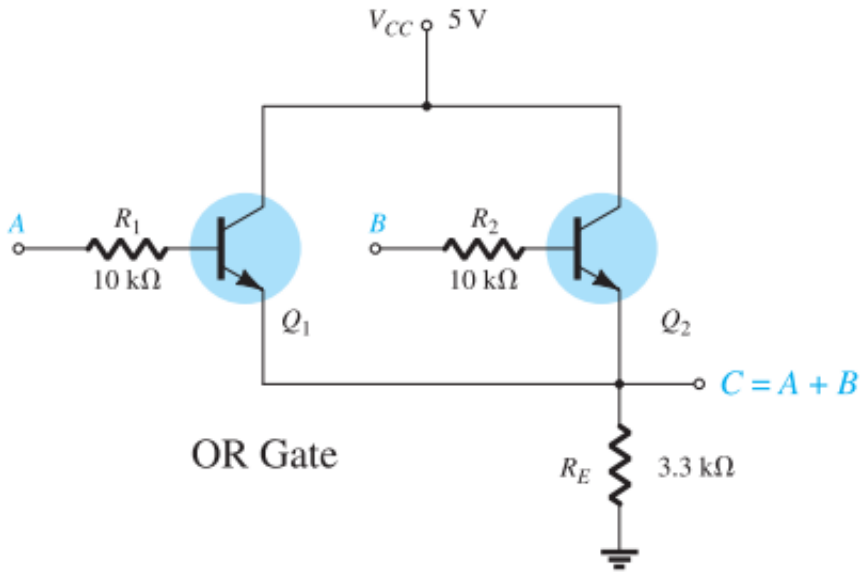


FIG. 4.112
Voltage level indicator.

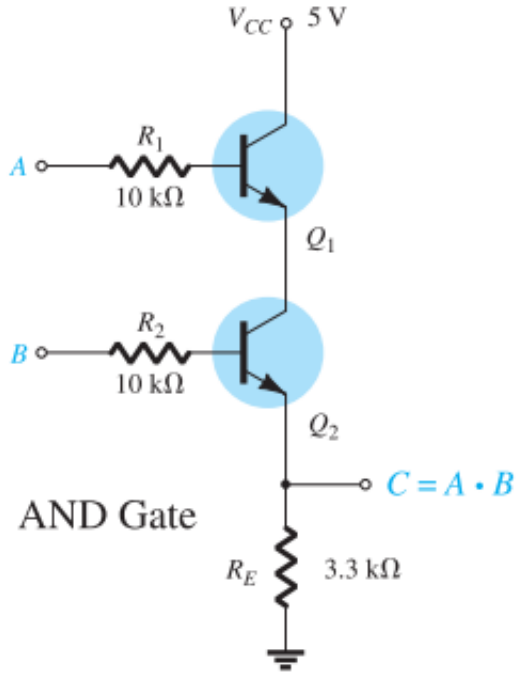
Practical Application
Logic Gates



A	B	C
0	0	0
0	1	1
1	0	1
1	1	1

1 = high
0 = low

(a)



A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

(b)

FIG. 4.111
BJT logic gates: (a) OR; (b) AND.

Thank You!