Analog Electronics
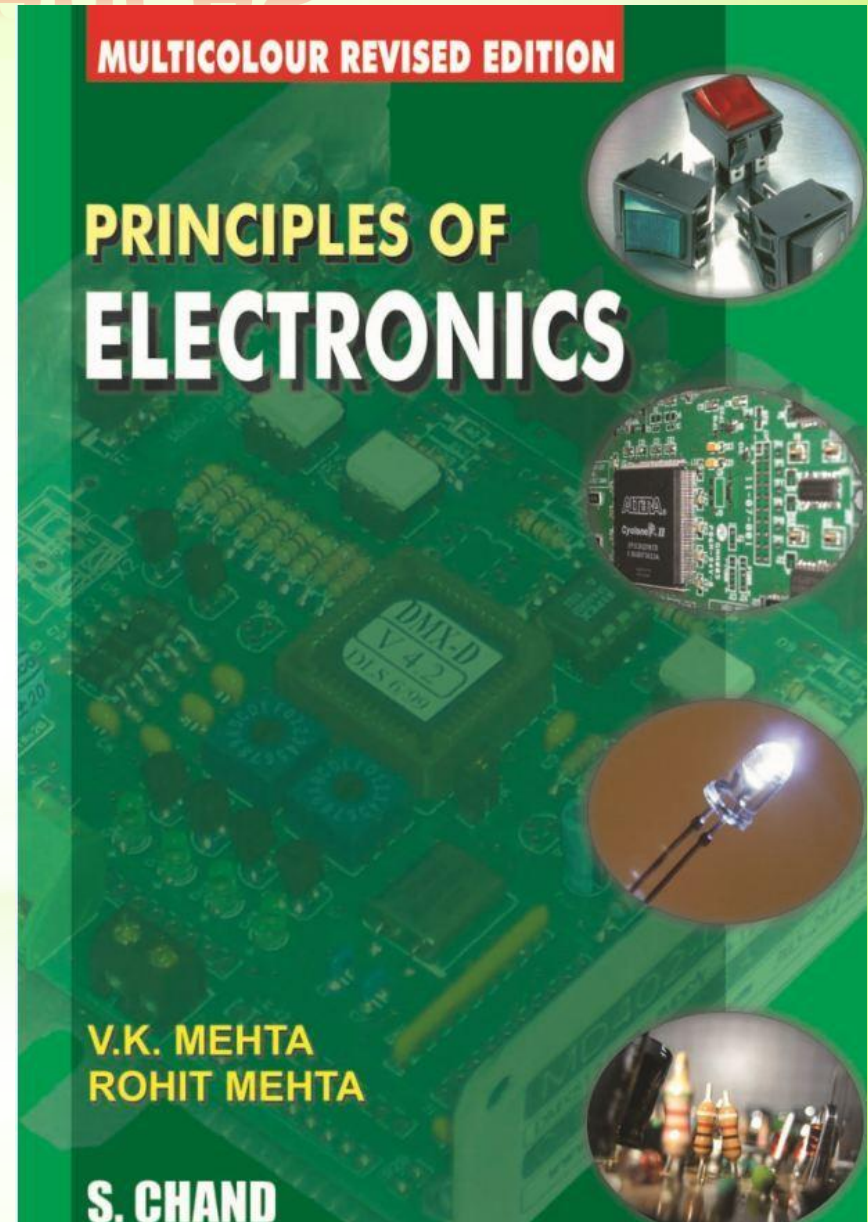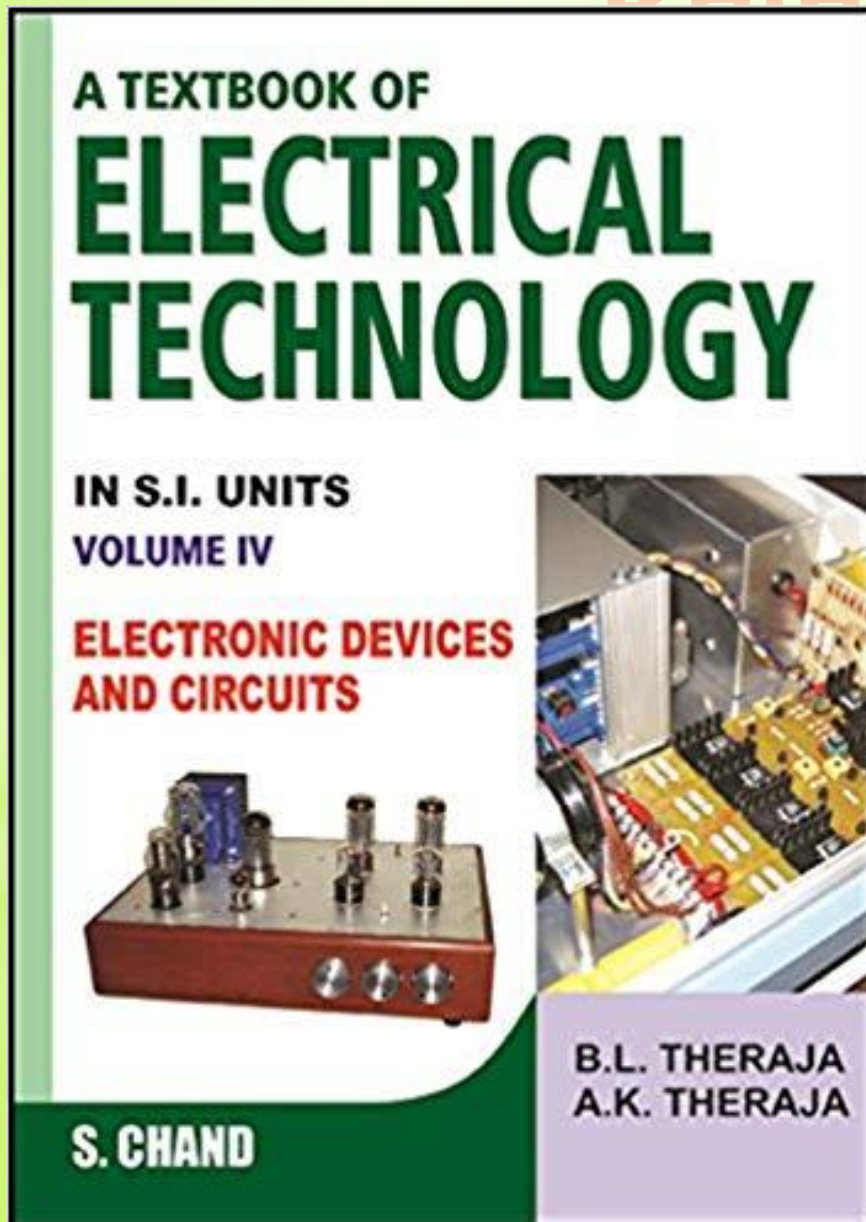
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References

A TEXTBOOK OF **ELECTRICAL TECHNOLOGY**

IN S.I. UNITS
VOLUME IV

ELECTRONIC DEVICES AND CIRCUITS

B.L. THERAJA
A.K. THERAJA

S. CHAND

MULTICOLOUR REVISED EDITION

PRINCIPLES OF **ELECTRONICS**

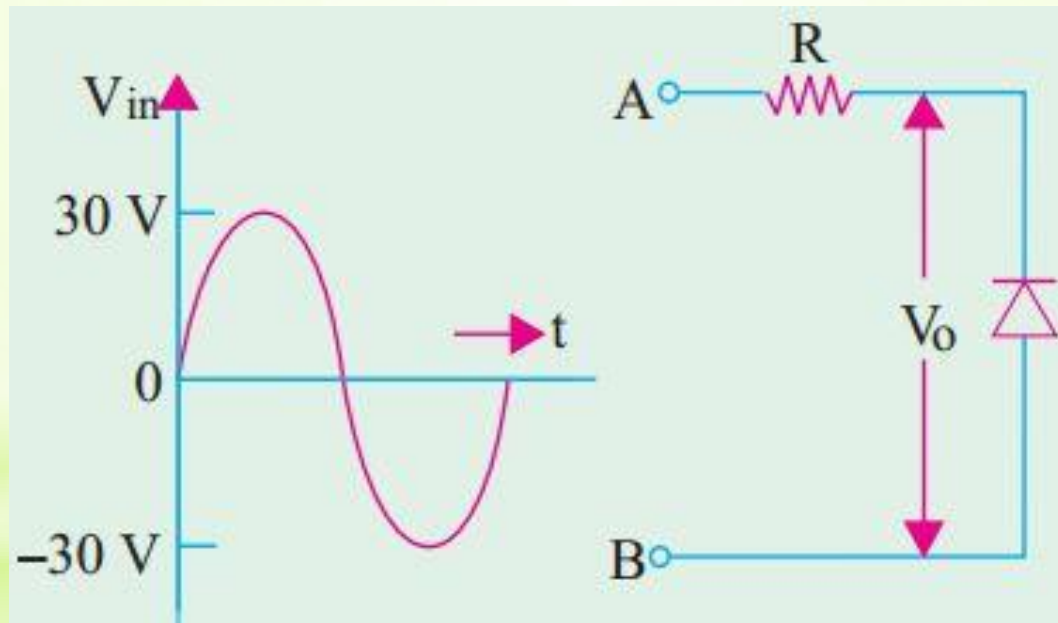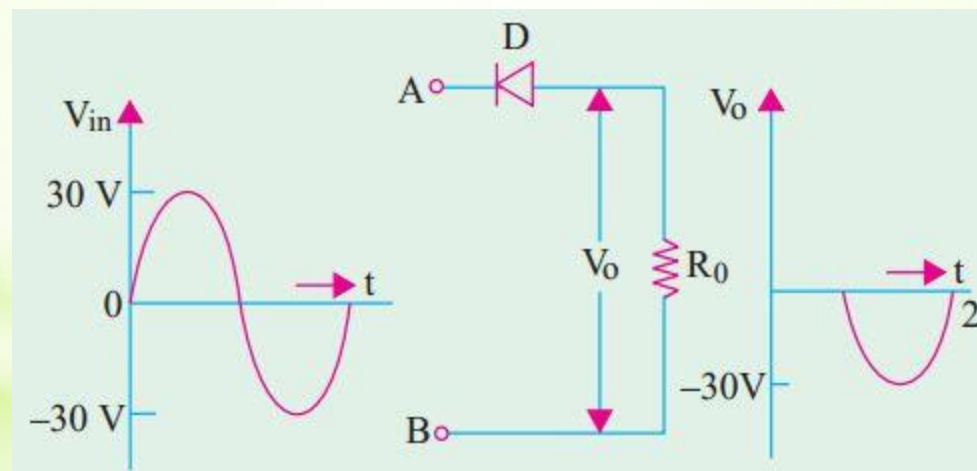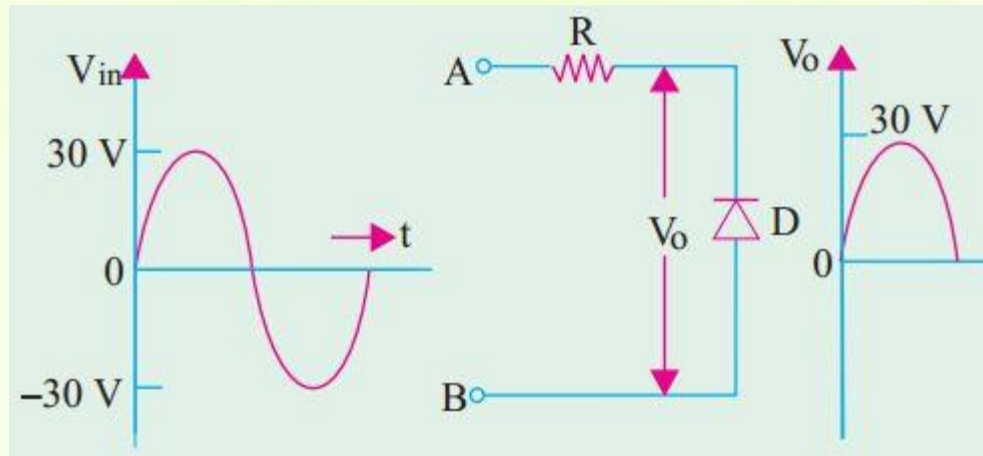V.K. MEHTA
ROHIT MEHTA

S. CHAND

Clipping Circuit

The circuit with which the waveform is shaped by removing a portion of the applied wave is known as a clipping circuit.

Problem 1

For the simple parallel clipper of Fig. 52.31, find the shape of the output voltage VO across the diode if the input sine wave signal is as shown in Fig. 52.31 (a). What will happen when diode and resistor are inter-changed ?

V_{in}

30 V

0

−30 V

t

R

A○—ⅤⅤⅤ—

V_o

D

V_o

30 V

0

V_{in}

30 V

0

−30 V

t

D

A○—◁|—

V_o

R_0

B○

V_o

t

2

−30V

Problem 2

A sinusoidal voltage of peak value 50 V is applied to a diode as shown in Fig. 52.21. Sketch the waveform of voltage VO treating the diode as an ideal one.
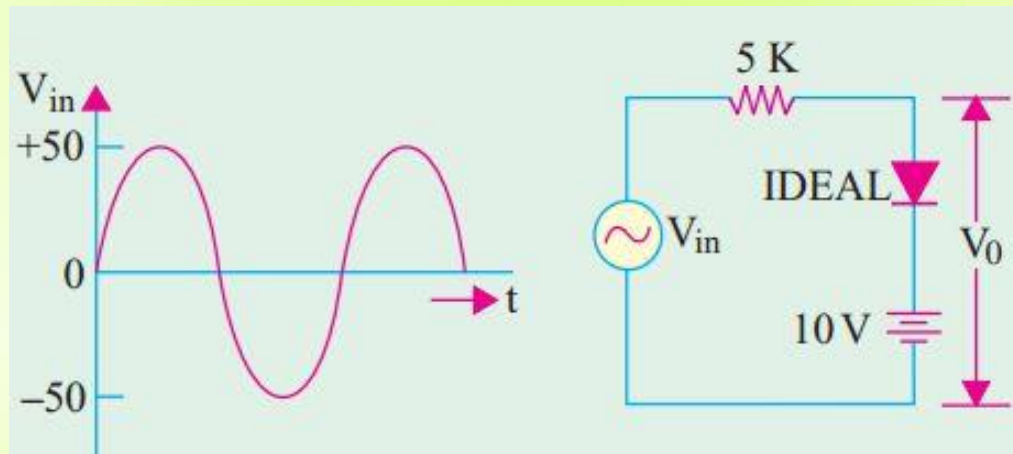
Example. 52.13. *A sinusoidal voltage of peak value 50 V is applied to a diode as shown in Fig. 52.21. Sketch the waveform of voltage V_O treating the diode as an ideal one.*

Solution. First, consider the positive half-cycle of the input signal. The diode acts as a short in the forward direction and the moment V_{in} exceeds battery voltage of 10 V, current will start flowing through the circuit. The value of V_O will remain steady at 10 V, the balance of 40 V dropping across 5 K resistance. It is seen that value of V_O is set by the battery voltage.
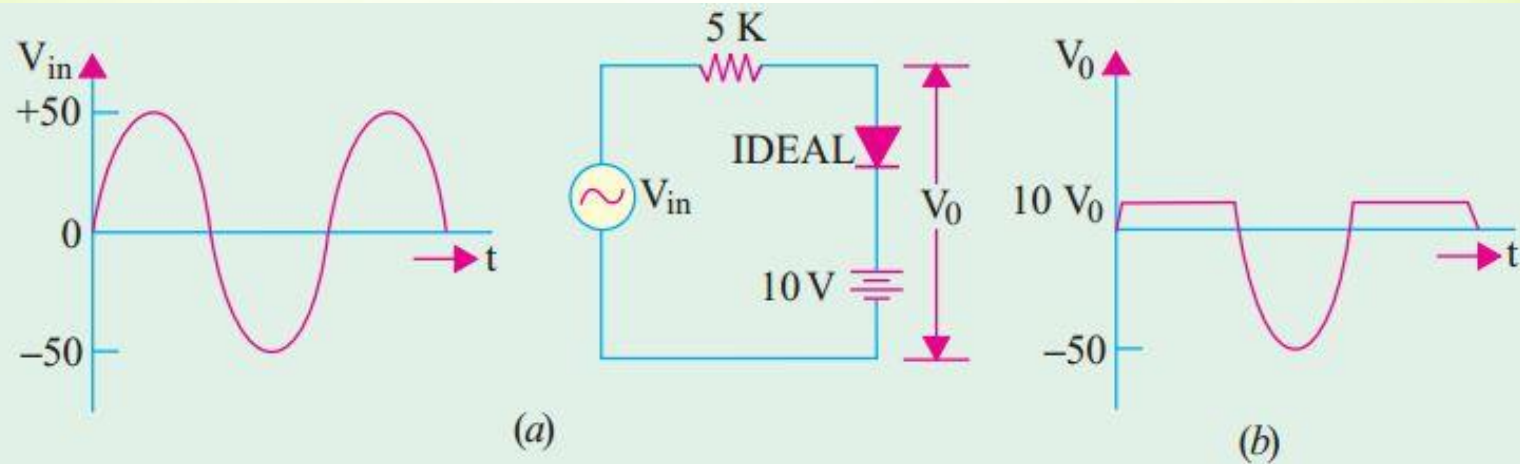

Fig. 52.21

Next, consider the negative input half-cycle. Now, the diode acts like an open switch. Consequently, there is no circuit current and thus no voltage drop across 5 K resistor. Hence, V_0 equals source voltage of peak value 50 V.

Problem 3

The triangular voltage of Fig. 52.36 (a) is applied to the biased parallel clipper circuit of Fig 52.36 (b). Find the wave-shape of the output voltage.
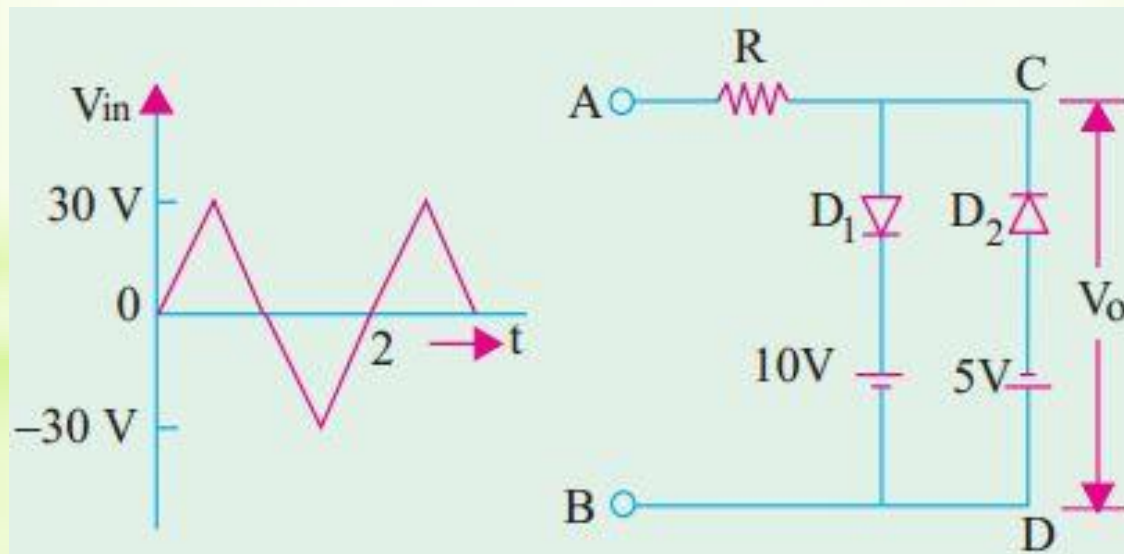
Solution. During the positive half-cycle, D_1 would conduct but D_2 will act as an open-circuit. However, value of V_0 cannot exceed 10V because points C and D are electrically connected across the 10 V battery since D_1 is shorted. Hence, signal voltage above 10 V level would be clipped off as shown in Fig. 52.36 (c).
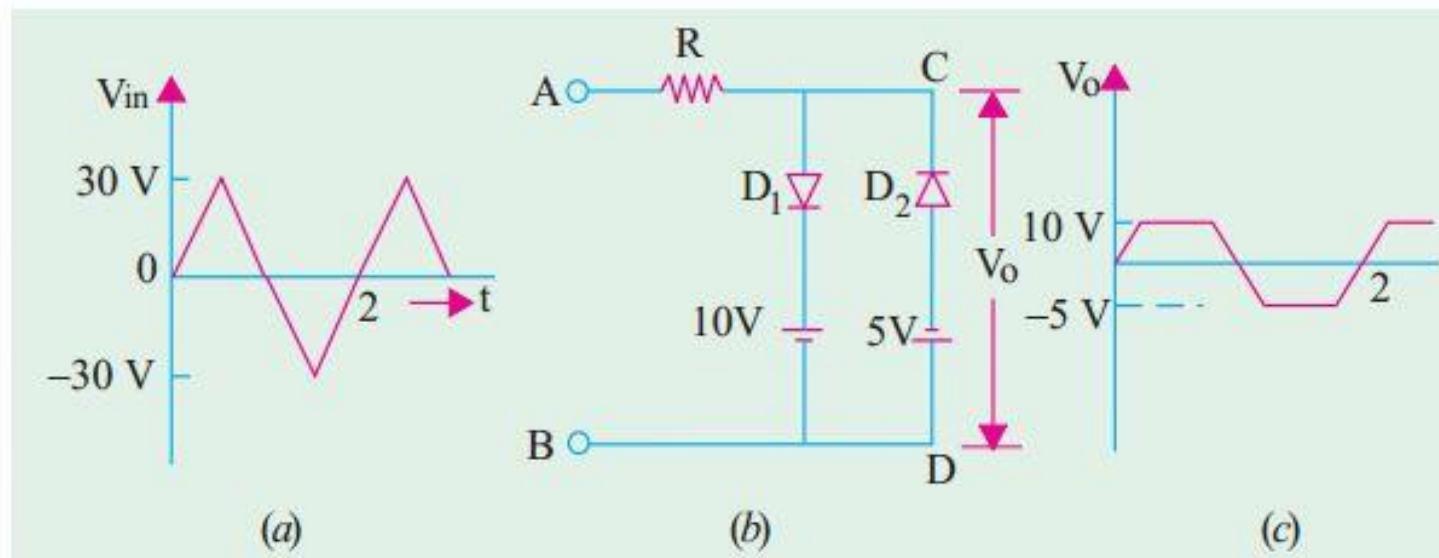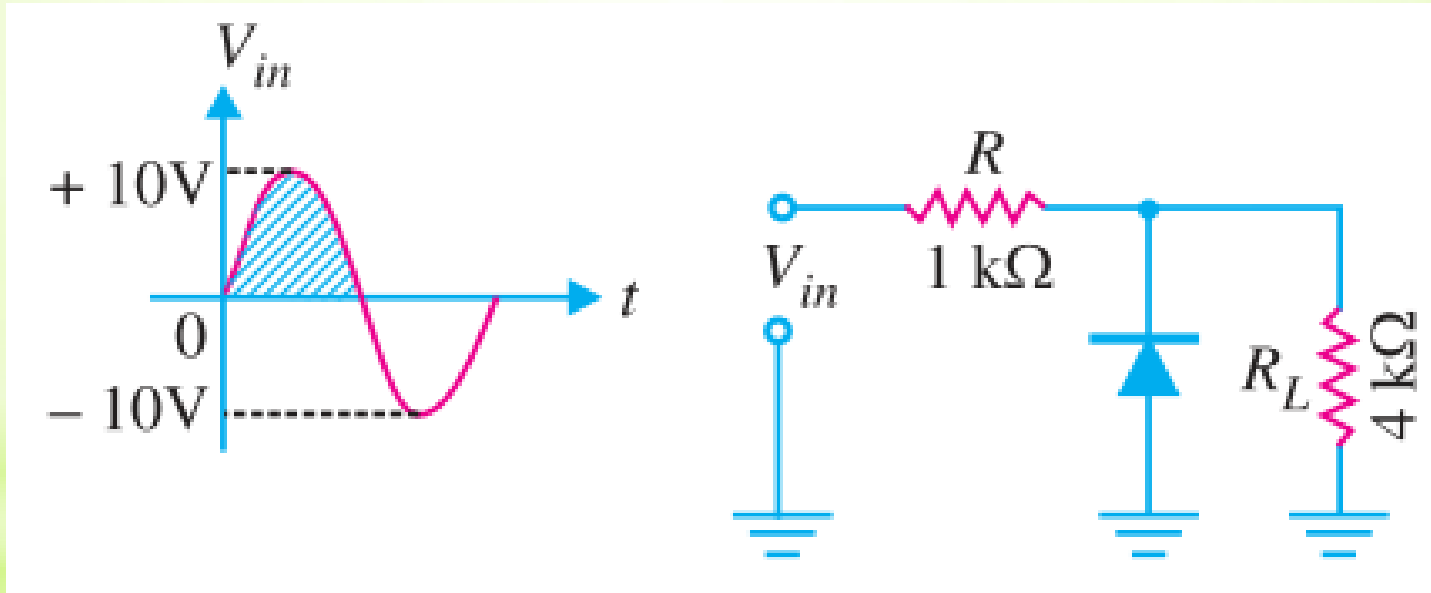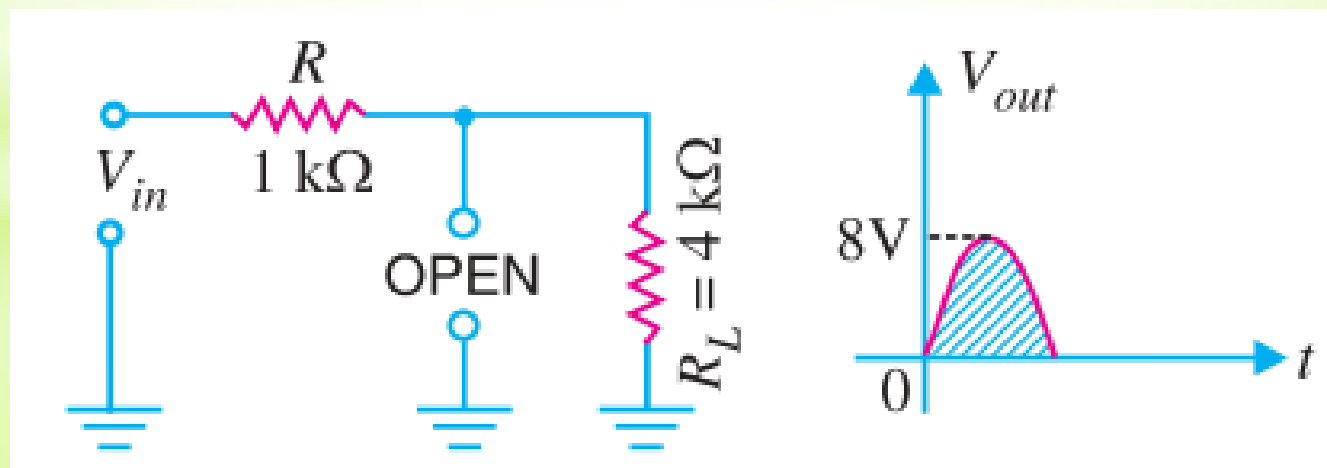

Fig. 52.36

Problem 4

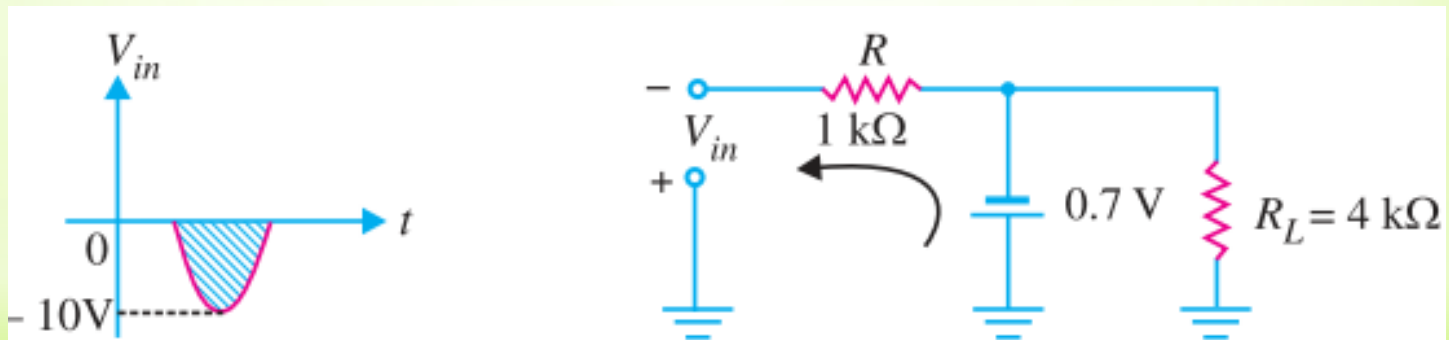The negative shunt clipper shown in Fig. 4 has a peak input voltage of +10 V. What is the peak output voltage from this circuit?
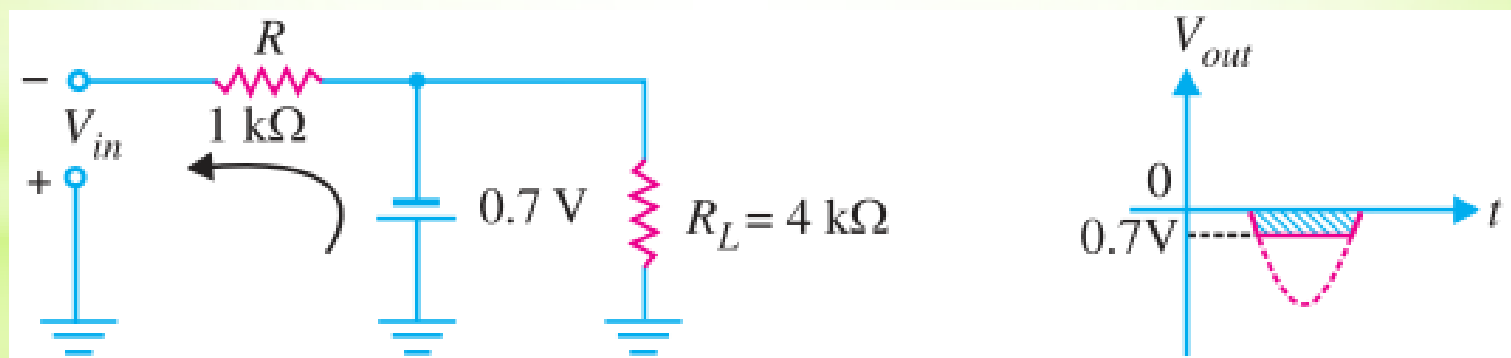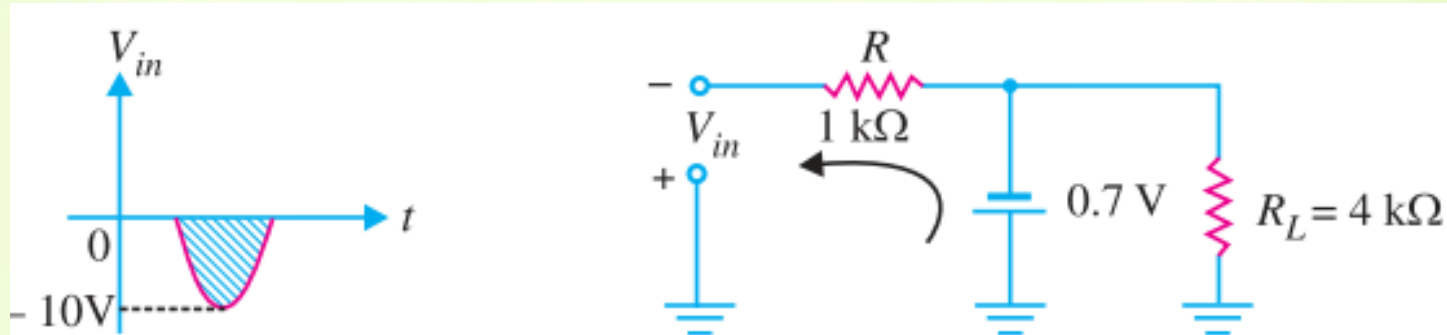
Problem 4
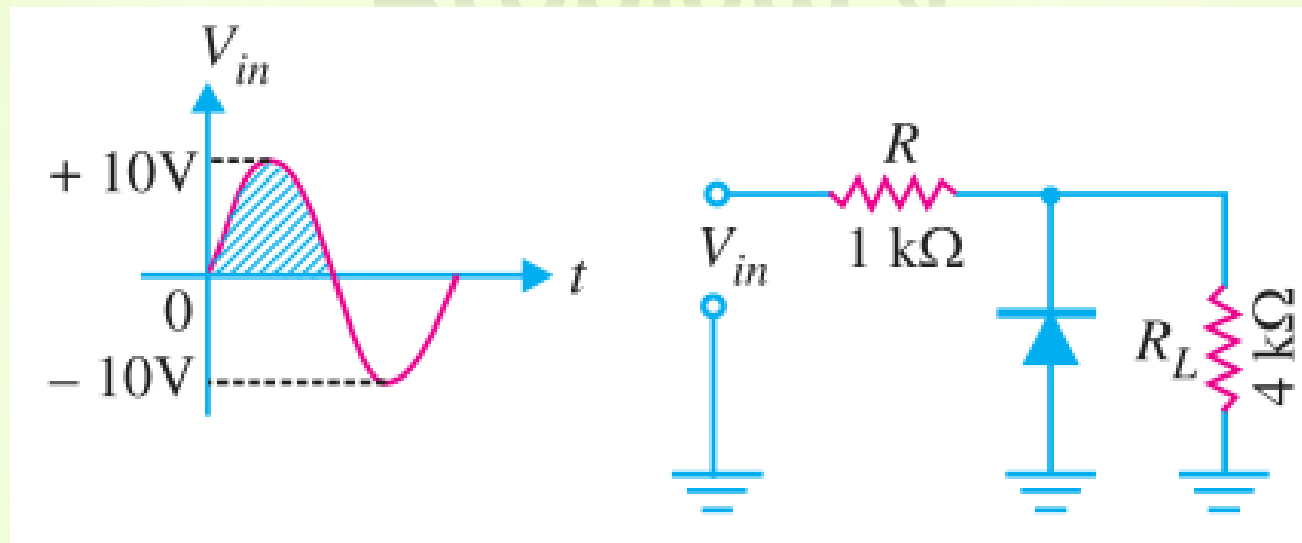
Problem 5

what will be the output voltage and voltage across R when the input voltage is -10 V ?

Problem 5

Problem 6

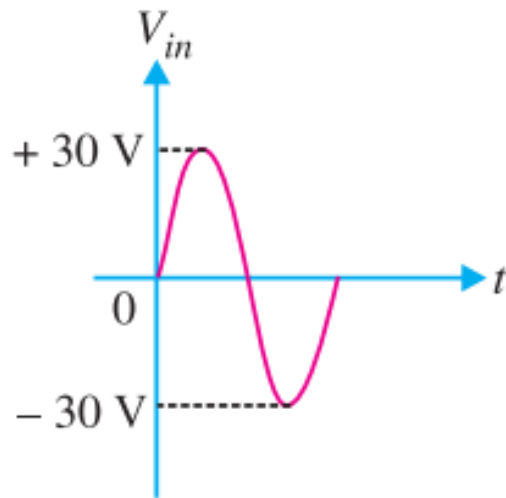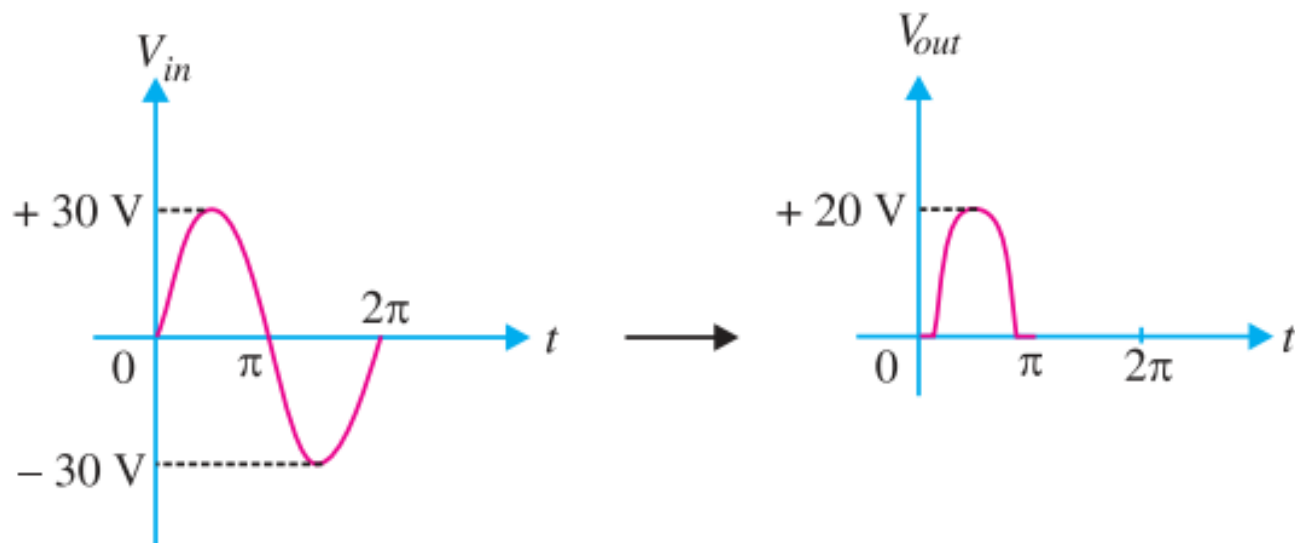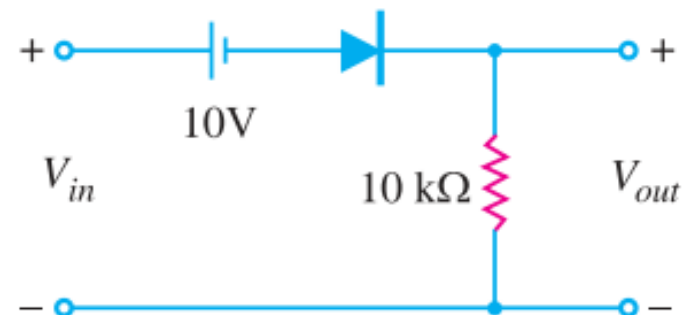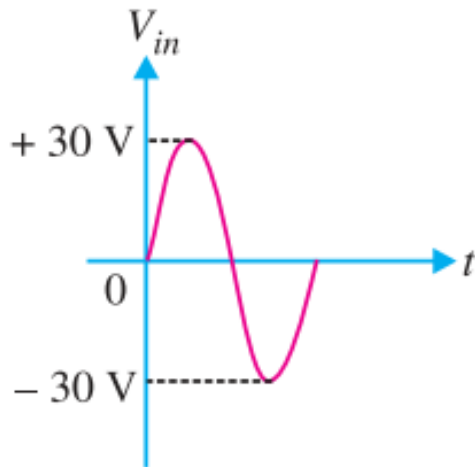For the input wave to the clipping circuit shown in Fig. 6, find the output waveform.
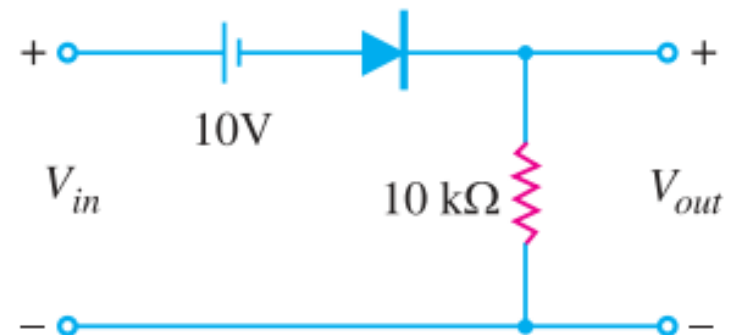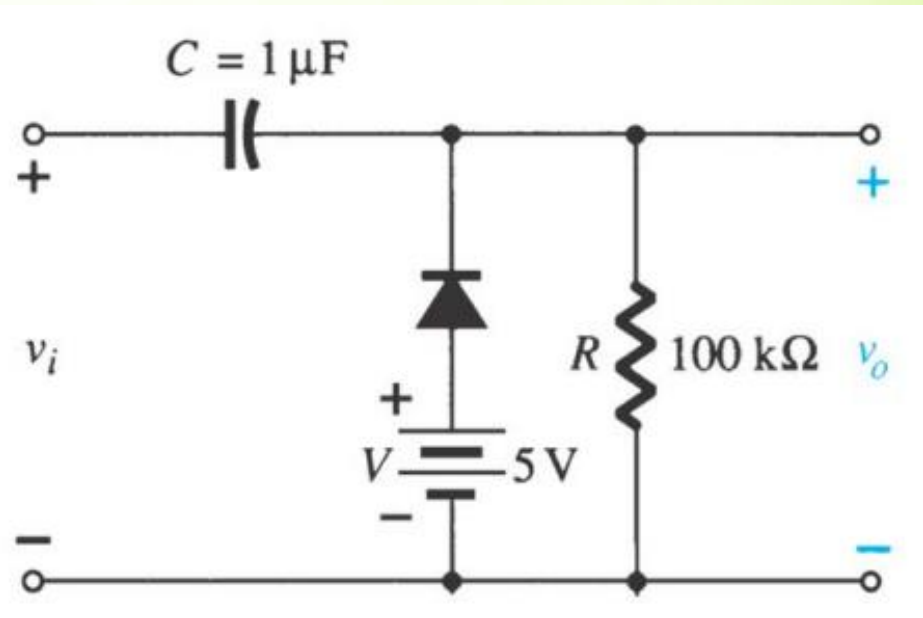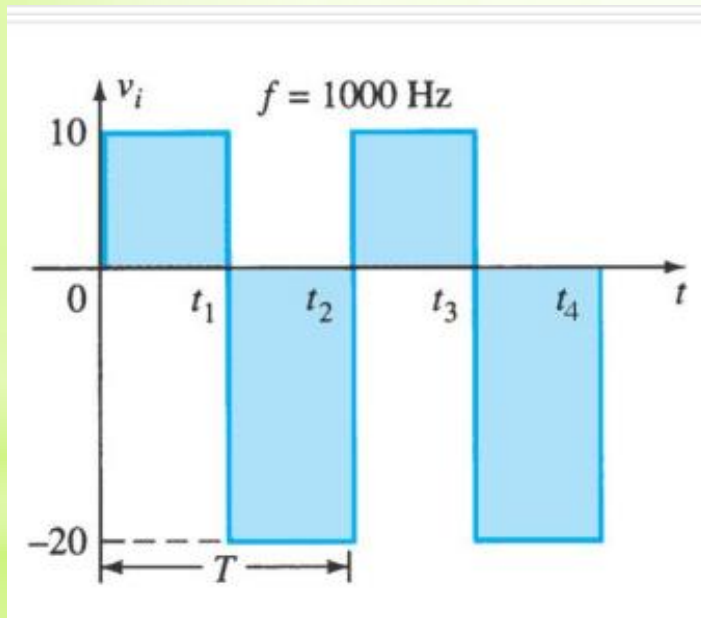
Problem 6

Clamping Circuits

A circuit that places either the positive or negative peak of a signal at a desired d.c. level is known as a **clamping circuit.**

Problem 7

Determine v_o for the following network with the input shown (for ideal diode).

Problem 7