

Elektrische Aandrijvingen

WTB

Lokatie/evenement

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1

Introduction

FIGURE 2-1 Dry cell.

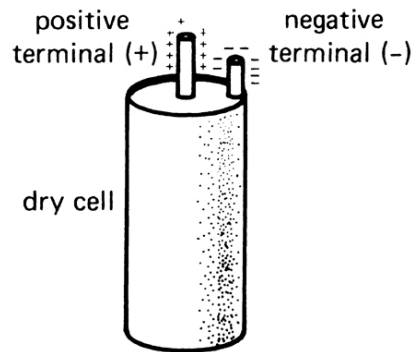


FIGURE 2-2 Electron flow.

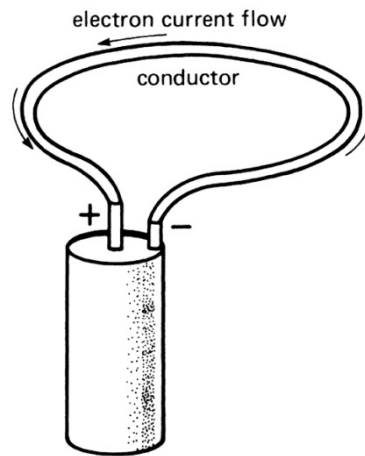


FIGURE 2-3 Conventional current flow.

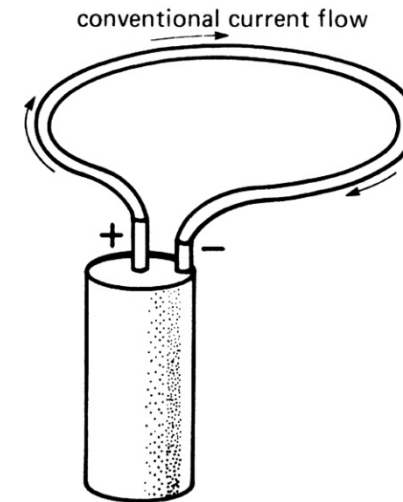
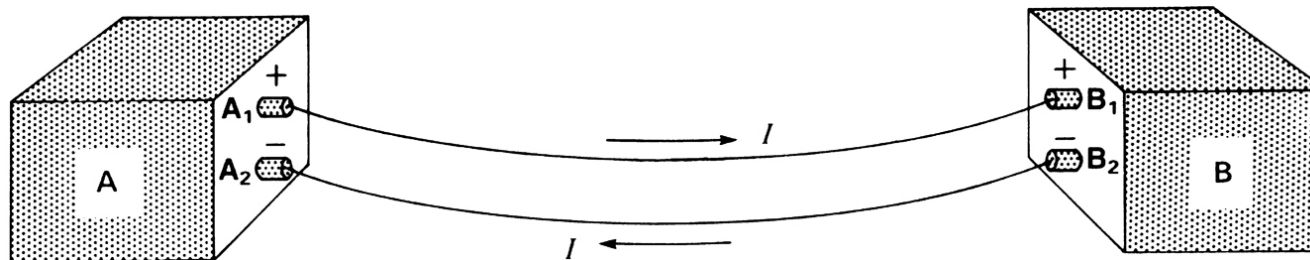


FIGURE 2-4 Distinction between a source and a load.



Sign notation

FIGURE 2-6 If $E_{21} = -100 \text{ V}$, terminal 2 is negative with respect to terminal 1.

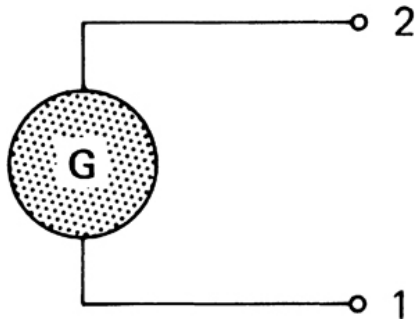


FIGURE 2-7 Sign notation to designate a voltage.

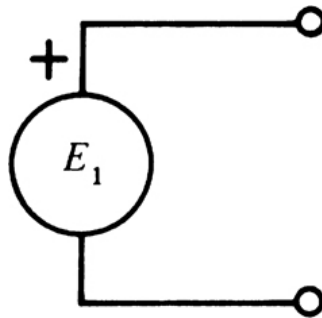


FIGURE 2-8 Circuit of Example 2-1.

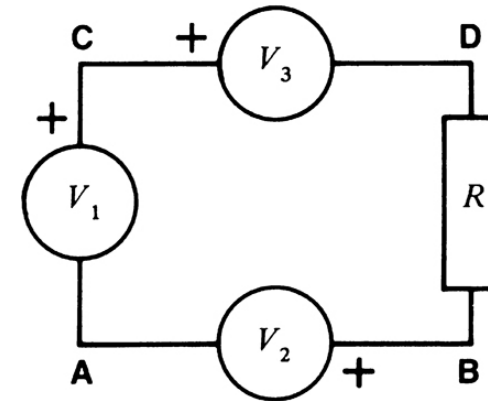
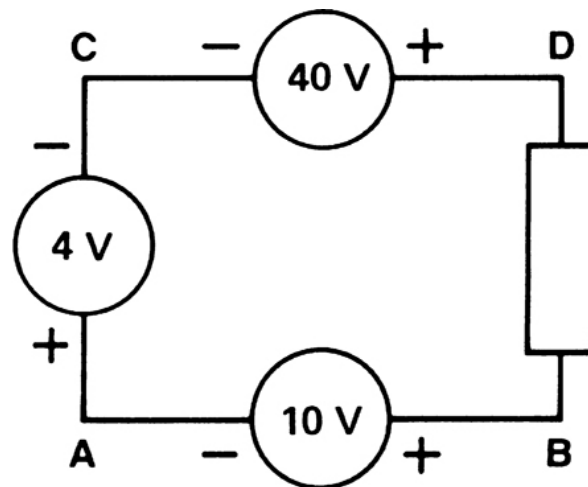
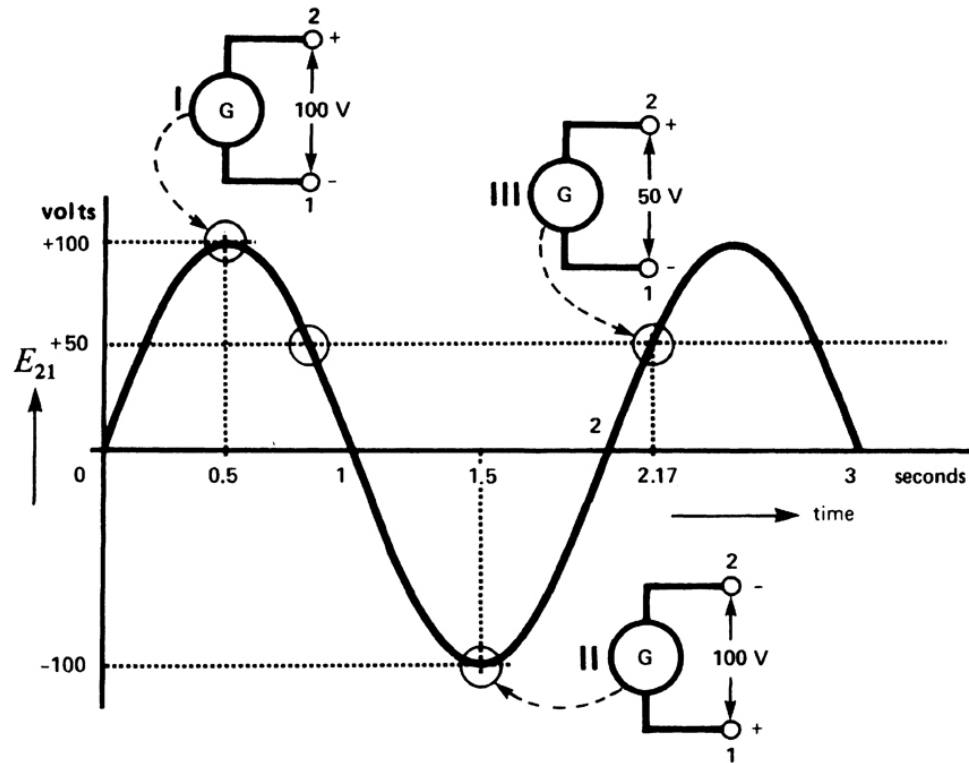


FIGURE 2-9 Solution of Example 2-1.



Alternating Voltage

FIGURE 2-10 Graph of an alternating voltage having a peak of 100 V.



Positive and Negative currents

FIGURE 2-12 Circuit element showing positive direction of current flow.

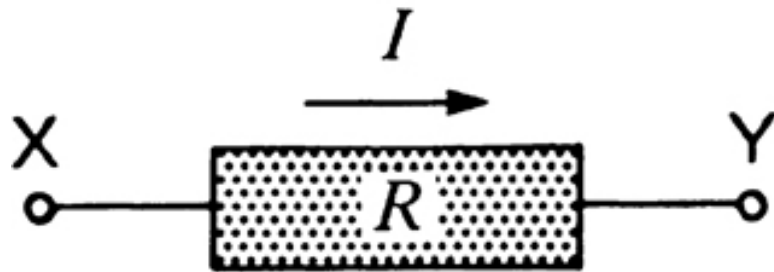


FIGURE 2-13 Electric circuit and the corresponding graph of current. The arrow indicates the positive direction of current flow.

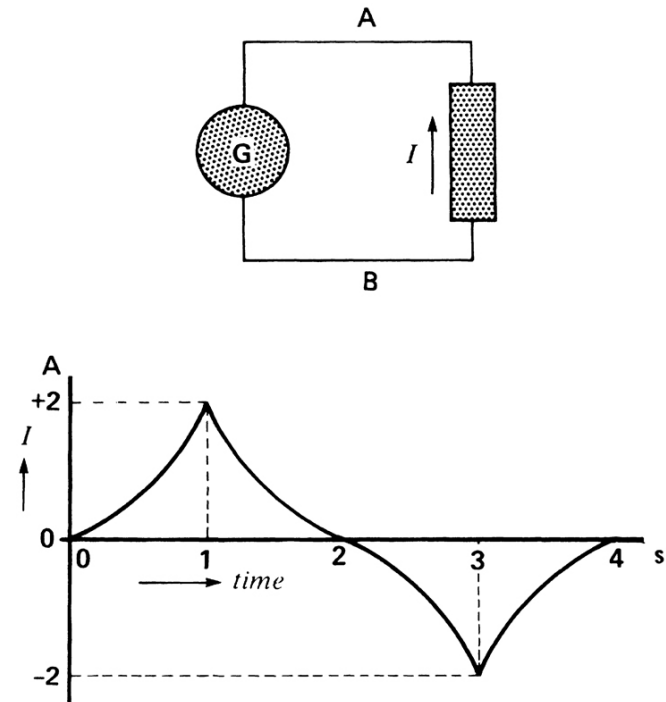
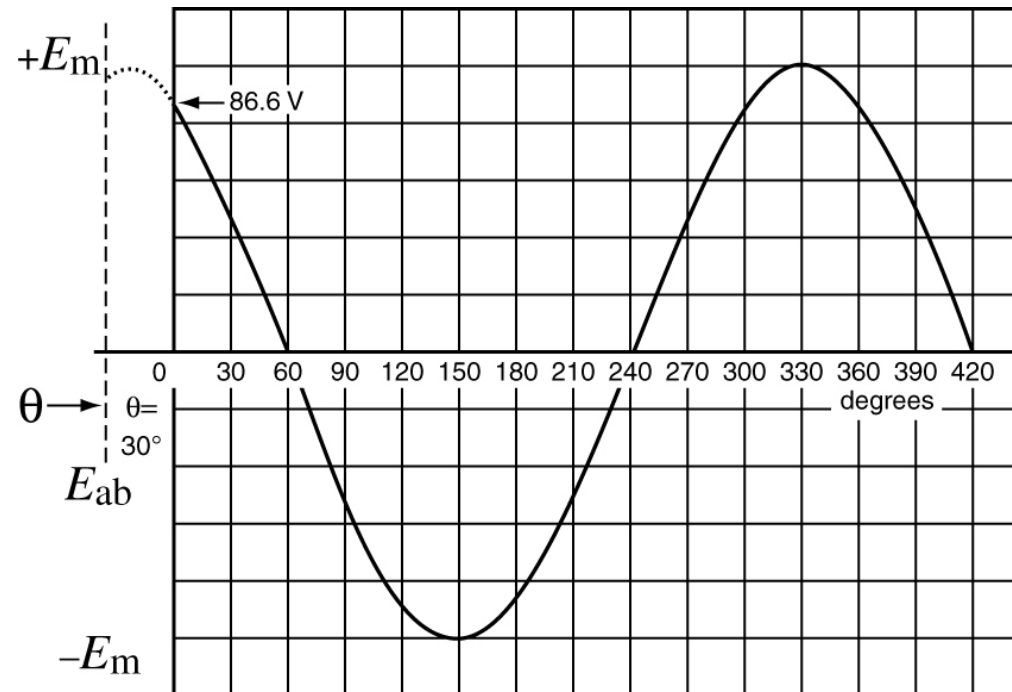
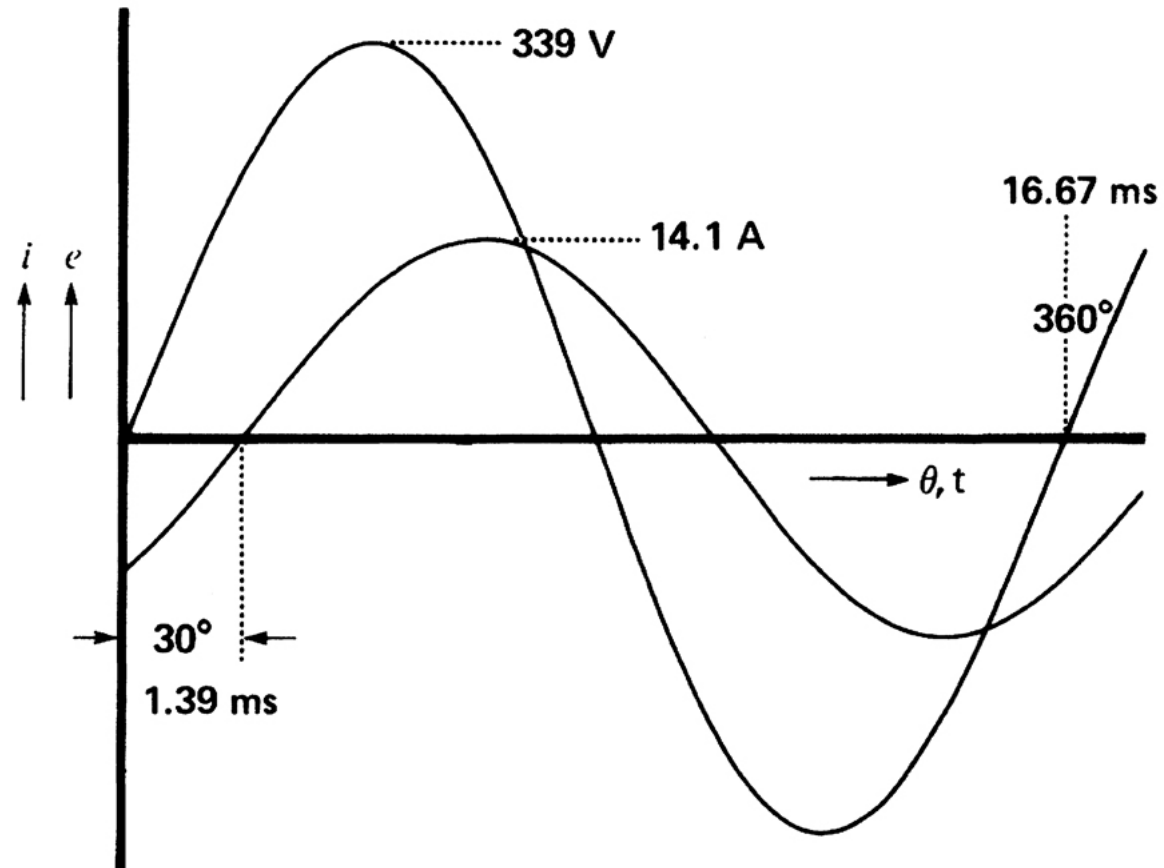


FIGURE 2-14 Sinusoidal voltage having a peak value of 100 V and expressed by $e_{ab} = E_m \cos(360 ft + 30^\circ)$.



$$e = E_m \cos(2 \pi ft + \Phi)$$

FIGURE 2-16 Graph showing the instantaneous values of voltage and current. The current lags 30° behind the voltage. The effective voltage is 240 V and the effective current is 10 A.



Phasor representation

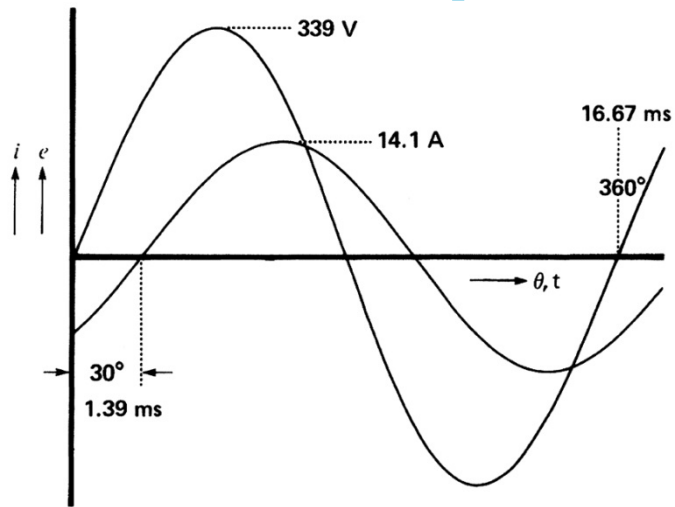


FIGURE 2-17 The current phasor I and voltage phasor E are in phase.

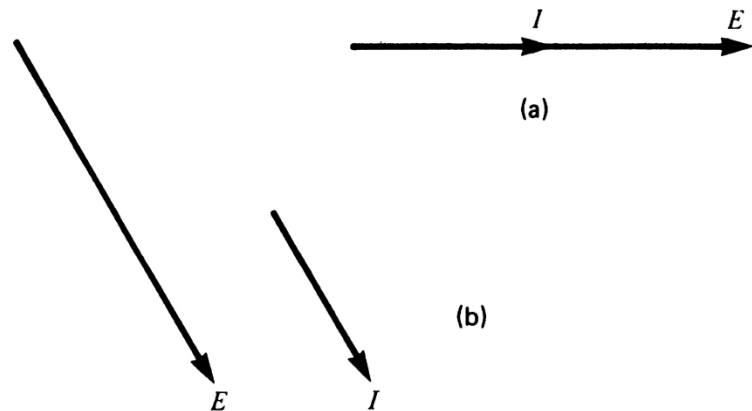


FIGURE 2-18 Phasor I lags behind phasor E by an angle of θ degrees.

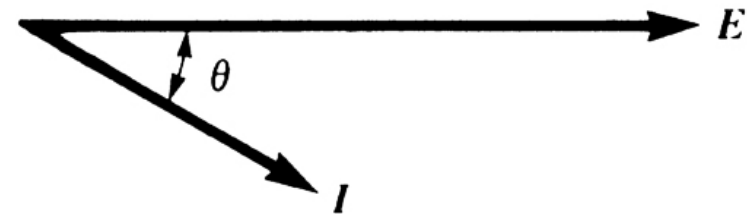
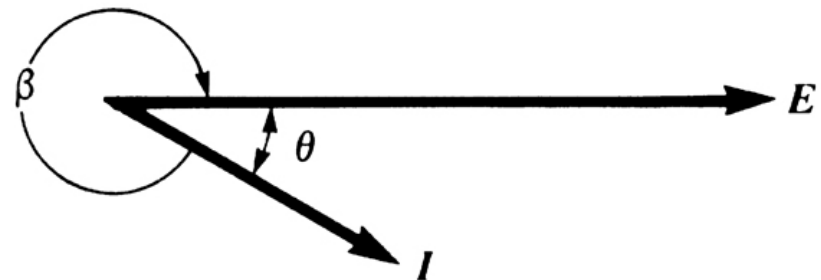


FIGURE 2-19 Phasor I leads phasor E by β degrees. But phasor I also lags E by θ degrees.



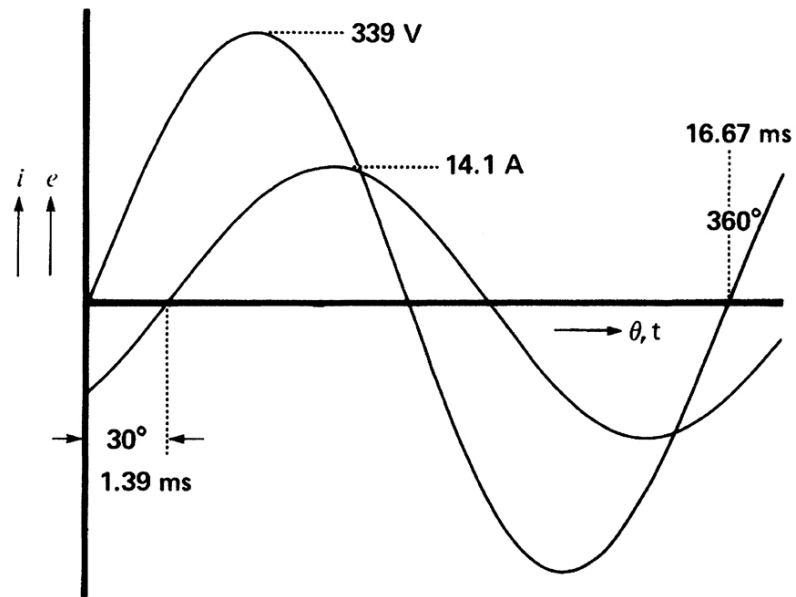
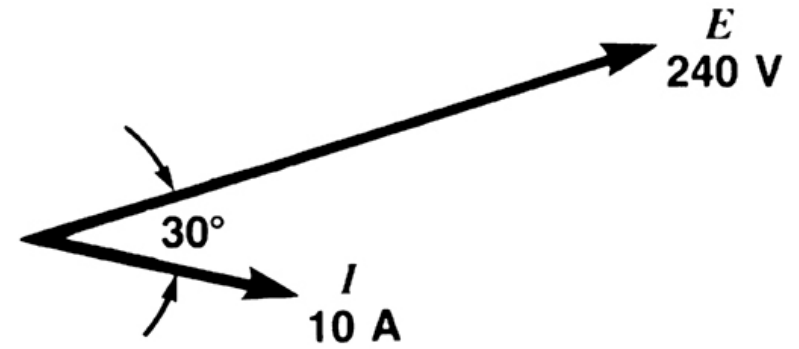


FIGURE 2-22 Phasor diagram of the voltage and current given in Fig. 2.16.



Harmonics

FIGURE 2-23 This severely distorted 60 Hz current obtained on an electronic drive contains the following harmonics: fundamental (60 Hz) = 59 A; fifth harmonic (300 Hz) = 15.6 A; seventh harmonic (420 Hz) = 10.3 A. Higher harmonics are also present, but their amplitudes are small. (Courtesy of Electro-Mécanik.)

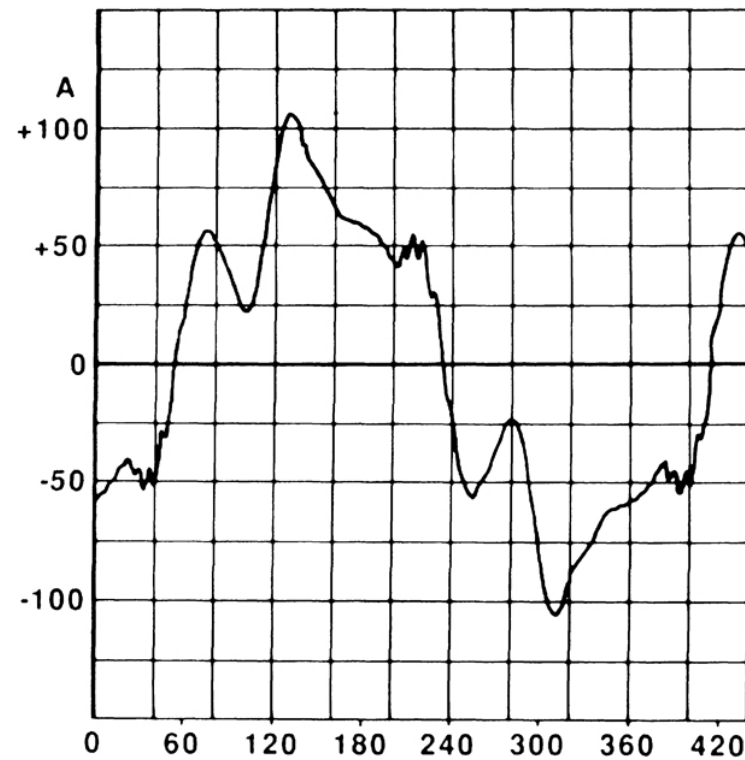
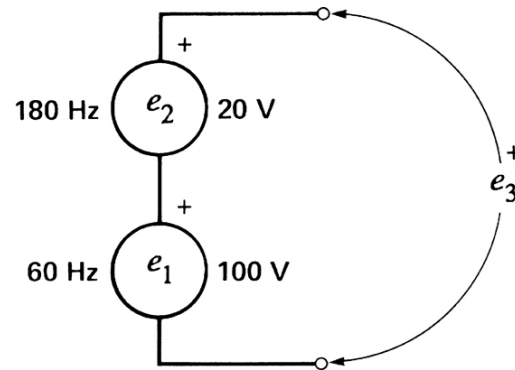
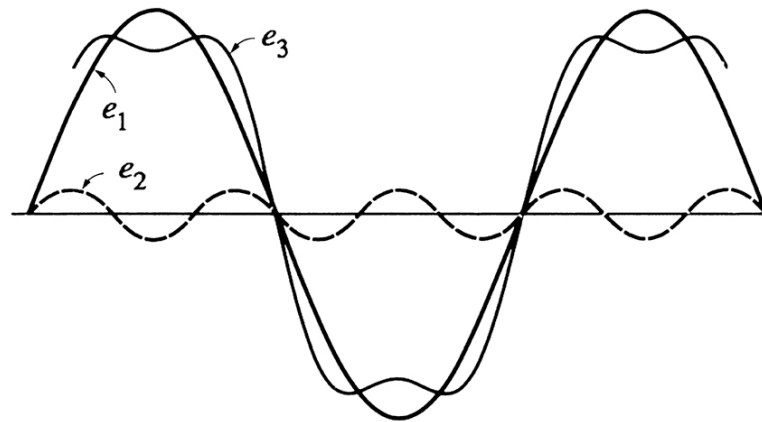


FIGURE 2-24 a. Two sinusoidal sources having different frequencies connected in series. b. A fundamental and third harmonic voltage can together produce a flat-topped wave.



(a)



(b)