Foundations of Analog and Digital Electronic Circuits Exercise and Problems Solutions

Henrik Samuelsson
henrik.samuelsson@gmail.com

About

This is my personal solutions to exercises and problems from the book Foundations of Analog and Digital Electronic Circuits. A copy of the book is needed to fully understand the solutions since I will not include the full exercise instructions here. Exact version of the book is from 2005 and it has the ISBN number 978-1-55860-735-4.

Very much appreciated if you contact me when you find errors in the solutions. My e-mail address can be found above this section.

Chapter 1

Exercise 1.1

Then the power dissipated in a purely resistive load fed from an AC supply is given as

$$P = \frac{V_{rms}^2}{R}$$

Rearrangement and insertion of known values gives the answer

$$R = \frac{V_{rms}^2}{P} = \frac{120^2}{1200} = 12\Omega$$

Exercise 1.2

(a) The energy stored in a fully charged 50 A-hour 12-V battery is

$$12 \cdot 50 \cdot 3600 = 2.16MJ$$

(b) The energy of water in a dam can be calculated by the following formula

$$E = m \cdot g \cdot h$$

We want to calculate the mass m, rearranging of the above formula gives

$$m = \frac{E}{g \cdot h} = \frac{2.16 \cdot 10^6}{9.82 \cdot 30} = 7331kg$$

This means that it takes 7 331 litres of water from a 30 meters high dam to charge the battery.

Exercise 1.3

The power dissipated in the resistor is given by

$$p = \frac{V_{DC}^2}{R}$$

Exercise 1.4

(a) The average power dissipated in R is

$$\bar{p} = V_{rms}^2 \frac{1}{R} = \left(\frac{V_{AC}}{\sqrt{2}}\right)^2 \cdot \frac{1}{R}$$

(b)

$$V_{DC} = \frac{V_{AC}}{\sqrt{2}}$$