Problem 1:

A buck converter has an input of 12 V and an output of 3 V.
The load resistor is 6 Ω, the f_{sw} is 400 kHz, L = 5 μH, and C =10 μF.

Determine

       a) duty ratio
       b) average and peak inductor currents
       c) average source current
       d) peak and average diode current

Problem 2:

A buck converter has an input of 50 V and an output of 25 V.
The f_{sw} is 100 kHz, and the output power to a load resistor is 125 W.
Determine

       a) duty ratio
       b) value of inductance to limit the peak inductor current to 6.25 A.
       c) minimum inductor current

Problem 3:

A boost converter circuit has the following parameters:

$$V_{in} = 5 \text{ V}, V_{out} = 20 \text{ V, and } P_{out} = 40 \text{ W}, f_{sw} = 85 \text{ kHz.}$$

Minimum value of the inductor current must be at least 80% of the average inductor current.

Determine the duty ratio and the minimum inductor value.

Problem 4:

A boost converter circuit has the following parameters:

$$V_{in} = 20 \text{ V, D} = 0.6, \text{ R} = 12.5 \text{ Ω, L} = 10 \text{ μH, C} = 40 \text{ μF}, f_{sw} = 200 \text{ kHz.}$$

Determine

       a) V_{out}
       b) Average, maximum, and minimum inductor currents.
       c) Average current in the diode