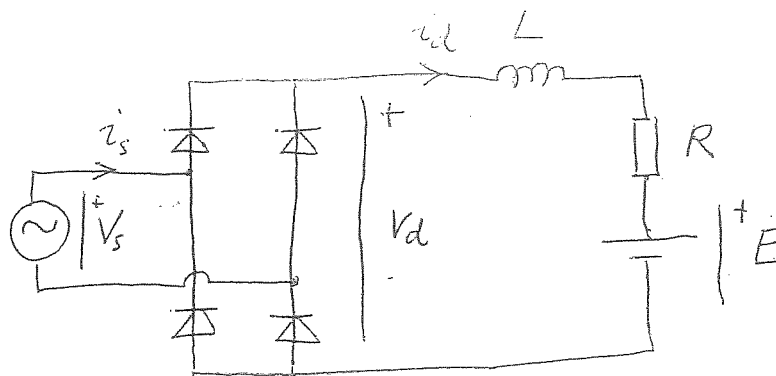# Peer assessment #2 in Power Electronics, *version A*

A single-phase diode rectifier fed from a 230 V/50 Hz sinusoidal voltage source has a load consisting of the series connection of a resistance $R = 2\,\Omega$, a very large inductance, and a voltage source $E = 187$ V .
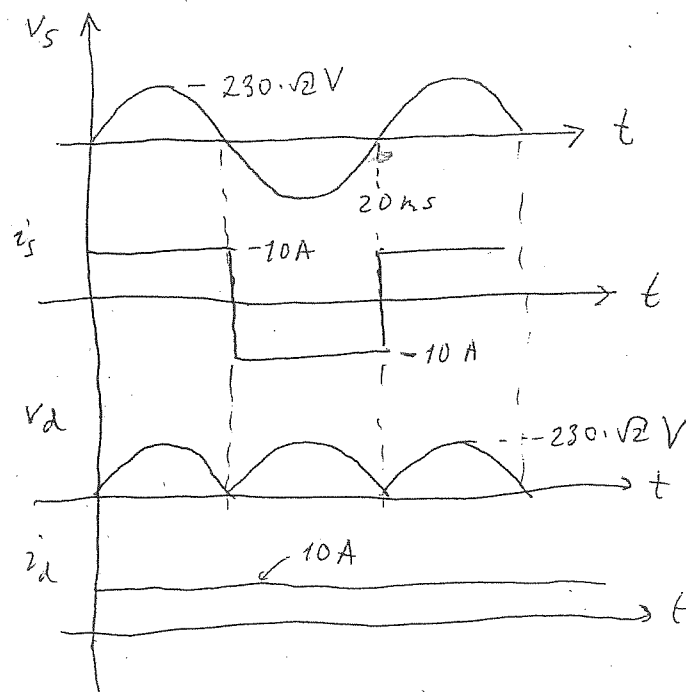
1. Draw a circuit diagram including all parts of the circuit. The voltages and currents on both the ac and dc sides should be indicated in the diagram.
2. Calculate the average value of the direct voltage.
3. Calculate the average value of the direct current.
4. Sketch the waveforms of the voltages and currents on both the ac and the dc sides. The axes of the diagrams should have scales such that peak values of the waveforms can be read.

$$V_d \approx 0{,}9 \cdot 230 = 207\,V$$

$$I_d = \frac{V_d - E}{R} = \frac{207 - 187}{2} = 10\,A$$

L is Large $\Rightarrow$ continuous current $i_d = I_d$

Peer assessment #2 in Power Electronics, *version B*

A single-phase diode rectifier fed from a 230 V/50 Hz sinusoidal voltage source has a load consisting of a resistor in series with an inductor. The direct current is totally smooth, $I_d = 10$ A.
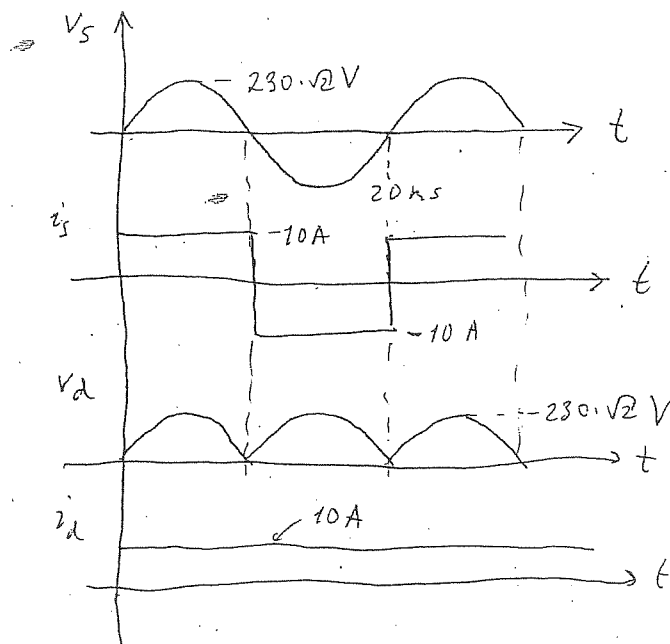
1. Draw a circuit diagram including all parts of the circuit. The voltages and currents on both the ac and dc sides should be indicated in the diagram.
2. Calculate the average value of the direct voltage.
3. Calculate the resistance on the dc side.
4. What is the RMS value of the alternating current.
5. Sketch the waveforms of the voltages and currents on both the ac and the dc sides. The axes of the diagrams should have scales such that peak values of the waveforms can be read.
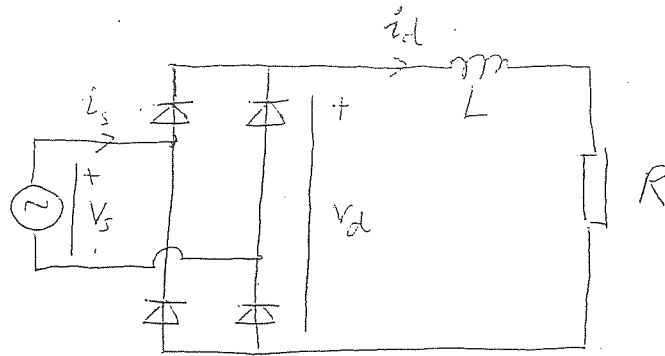
$$V_d = 0{,}9 \cdot 230 = 207 \ V$$

$$R = \frac{V_d}{I_d} = \frac{207}{10} = 20{,}7 \ \Omega$$
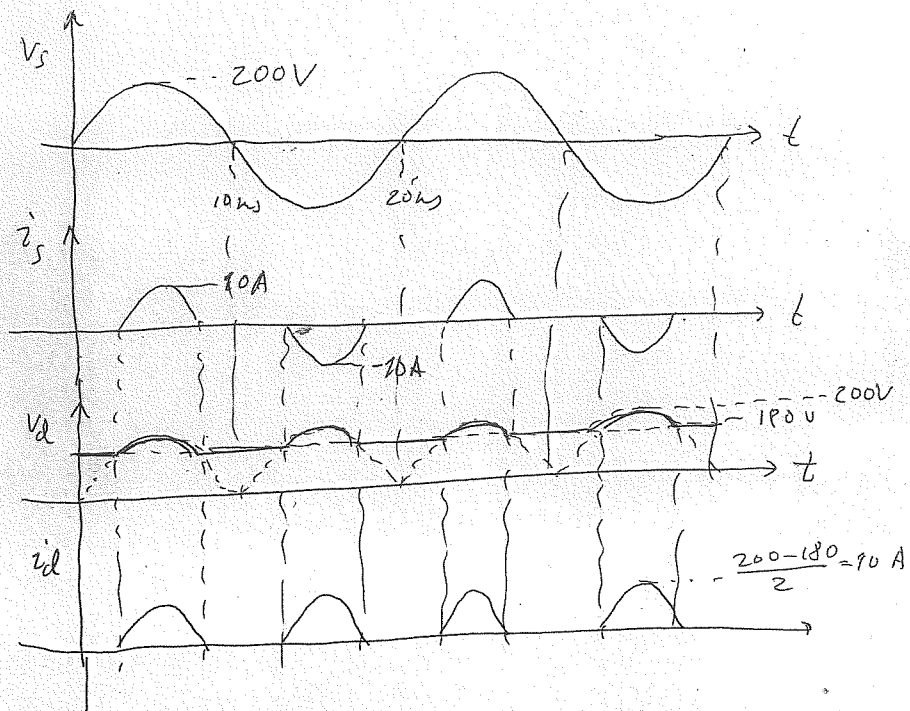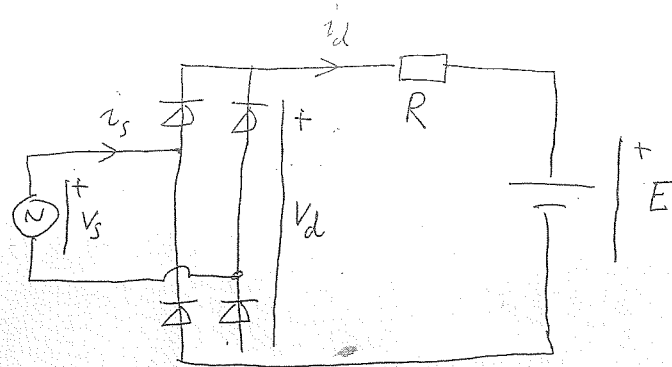
$$I_{s\,RMS} = I_d = 10 \ A$$

Peer assessment #2 in Power Electronics, *version C*

A single-phase diode rectifier fed from a sinusoidal voltage source with the rms value $200/\sqrt{2}$ V and a frequency of 50 Hz has a load consisting of a resistor in series with a direct voltage source, $R = 2\ \Omega$, $E = 180$ V.

1. Draw a circuit diagram including all parts of the circuit. The voltages and currents on both the ac and dc side should be indicated in the diagram.
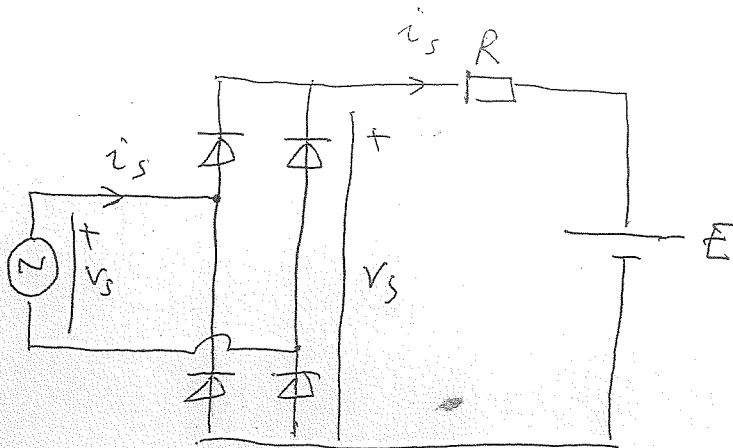
2. Sketch the waveforms of the voltages and currents on both the ac and the dc side. The axes of the diagrams should have scales such that peak values of the waveforms can be read.

Peer assessment #2 in Power Electronics, *version D*

A single-phase diode rectifier fed from a sinusoidal voltage source with the rms value $200/\sqrt{2}$ V and a frequency of 50 Hz has a load consisting of a resistor in series with a direct voltage source, $R = 10\ \Omega$, $E = 100$ V.

1. Draw a circuit diagram including all parts of the circuit. The voltages and currents on both the ac and dc side should be indicated in the diagram.

2. Sketch the waveforms of the voltages and currents on both the ac and the dc side. The axes of the diagrams should have scales such that peak values of the waveforms can be read.