

## ELEC-E8412 Power Electronics

/ Exercise # 4

5.11.2020

### Problem 1:

A single-phase full-wave rectifier has a resistive load of  $12\ \Omega$  and an ac source of 120-V rms and 60 Hz. Determine

- (a) the average, peak, and rms currents in the load and in each diode.
- (b) Determine the peak reverse voltage across each of the diodes

### Problem 2:

A single-phase full-wave rectifier with an ac source of  $200 \sin(377t)$  V has a resistive load of  $20\ \Omega$ . Determine

- (a) the average current in the load and in each diode,
- (b) the peak reverse voltage across each of the diodes,
- (c) the power factor

### Problem 3:

The controlled single-phase bridge rectifier has an  $18\ \Omega$  resistive load and has a 120-V rms, 60-Hz ac source. The delay angle is  $45^\circ$ . Determine

- (a) the average load current,
- (b) the rms load current,
- (c) the rms source current,
- (d) the power factor.

**Problem 4:**

The full-wave rectifier has a 120-V rms 60 Hz source,  $R=200\ \Omega$  and  $C=200\ \mu F$ . Determine

- (a) the peak-to-peak voltage variation of the output
- (b) the filter capacitance required to limit the peak-to-peak output voltage ripple to 1 percent of the dc output.

**Problem 5:**

The full-wave rectifier has a 60-Hz ac source with maximum voltage of 100 V. It is to supply a load that requires a dc voltage of 100 V and will draw 0.4 A. Determine the filter capacitance required to limit the peak-to-peak output voltage ripple to 1 percent of the dc output.