University of New Mexico

Department of Electrical and Computer Engineering

ECE 321L – Electronics I (Fall 2025) Homework #4

Due in class: Wednesday September 17, 2025

- 1. A full wave rectifier using a diode bridge and a 120V/12V transformer is designed to deliver power to a 10Ω load. Assume all diodes have Von=0.7V and negligible off current.
 - **a.** What is the ripple voltage, if the capacitance of the filter is $2500\mu F$?
 - **b.** Considering the ripple calculated in part a, what is the average DC voltage of the output (hint: it will be approximately the peak (max) voltage minus Vr/2)?
 - **c.** Considering the average DC voltage of the output found in part b, determine the average current and power in the load resistor.
- Design a full wave rectifier for a regulator that delivers 100W electrical power to a white off-the-shelf LED (http://www.wayjun.com/Datasheet/Led/100W%20White%20LED.pdf). Per datasheet, the LED requires 33V and draws 3A current. You are required to limit the ripple voltage to less than 20% of average DC voltage of the output. Assume all diodes have Von=0.7V and negligible off current.
 - **a.** Draw the circuit diagram.
 - **b.** Determine the voltage of transformer and capacitance of the filter.