

HW4

MTLE-6120: Spring 2017

Due: Mar 27, 2017

1. **Kasap 5.11: Ionization at low temperatures in doped semiconductors**

Note that there are effectively three questions in that problem, listed out below for clarity:

- (a) Show equation 5.85 for n -doping.
- (b) Show that 5.85 reduces to 5.19 at low temperatures.
- (c) Estimate 90% ionization temperature for Ga p -doping in Si. (Please write out the full expression for temperature before substituting numbers.)

2. **Kasap 5.18: Hall effect in semiconductors**

Hint: maybe do part (b) first to get some intuition.

3. **Kasap 5.20: Compound semiconductor devices**