

## Homework 1

**EE 362 Electronic, Magnetic, & Optical Properties of Materials (Spring 2026)**

**Thursday, January 15, 2026**

- 1) 1.4 Also, calculate the mass density of a) GaAs and b) Ge.
- 2) 1.7
- 3) 1.12
- 4) 1.13
- 5) For room temperature barium in its crystal state, determine/calculate: a) Bravais lattice type, b) lattice constant(s), c) sketch primitive unit cell, d) atomic volume density, e) atomic surface density for top face, f) standard atomic weight, and g) mass density (How does your calculated value compare with accepted measured value?). Hint: Use Wikipedia as a resource.
- 6) A face-centered cubic lattice has a lattice constant of  $8 \text{ \AA}$ . Find the Miller indices for a plane with intercepts on the three Cartesian axes at: a)  $x = 8 \text{ \AA}$ ,  $y = 8 \text{ \AA}$ , &  $z = 8 \text{ \AA}$ , b)  $x \rightarrow \infty$ ,  $y = 8 \text{ \AA}$ , &  $z = 8 \text{ \AA}$ , and c)  $x = 8 \text{ \AA}$ ,  $y = 8 \text{ \AA}$ , &  $z = 24 \text{ \AA}$ .
- 7) 1.18
- 8) 1.20
- 9) 1.21abc

**Due Friday, January 23, 2026.**

Hint: Unless otherwise specified, consult Appendix B and/or Appendix C for material properties.