NORTHERN ILLINOIS UNIVERSITY

PHYSICS DEPARTMENT

Physics 283 – Modern Physics   Spring 2024

Problem Set #10

Problem Set Due: Thurs., May 2, 2024
Read Krane: Chapter 11

1.   **OpenStax University Physics Vol. 3: Section 2.4:** Problem 61 (note: this is section 2.4)
2.   **OpenStax University Physics Vol. 3: Section 2.4:** Problem 63 (note: this is section 2.4)
3.   **OpenStax University Physics Vol. 3: Section 2.8:** Problem 99
4.   **OpenStax University Physics Vol. 3: Section 2.8:** Problem 121

5. In class we calculated the density of states for a 1 and 3-dimensional particle in a box (see
    Lecture notes (L#3) on the Physics 283 WebPage [www.niu.edu/brown]). Using a similar
    method, calculate the density of states for a 2-dimensional particle in a box. You should find
    that the density of states is independent of energy. (I have attached Krane's solution—he
    gives the density of states per unit area)

6. **Krane: Problem 4**   **page 384**
    Draw a figure of the bcc structure of CsCl labeled with distances between the atoms

7. **Krane: Problem 17**   **page 385** (just show calculation)

8. **Krane: Problem 22**   **page 385**
     Part (b) which one is obviously the better conductor?

9. **Krane: Problem 23**   **page 385**
     Part (b) which one is obviously the better conductor?

10. **Krane: Problem 28**   **page 385**

11. **Krane: Problem 34**   **page 386**

12. **Krane: Problem 36**   **page 386**