

Solids worksheet

Lecture 23 The Solid State Worksheet

- 1) Which of the following structures is most likely to be a solid at room temperature? Justify your answer in terms of intermolecular interactions.



- 2) What are the main factors that account for the extreme hardness of diamond?
- 3) Create a visual representation of a metallic solid that can be used to explain the electron sea model of metallic bonding. Use that representation to help you explain the factors that make metals good conductors of heat and electricity?
- 4) Which substance in each set has the highest melting point? Justify your answer using chemical principles.
- KCl or SiO_2
 - NH_3 or $\text{C}_{\text{diamond}}$
- 5) The following questions pertain to silicon semiconductors.
- Explain why silicon is a poor conductor of electricity at room temperature? Create an energy level diagram that shows the valence and conducting bands associated with silicon's molecular orbitals to help with your explanation.
 - Explain why silicon is able to conduct electricity better at higher temperatures.
 - What is an n-type semiconductor and explain how it improves the conductivity of silicon. Create a diagram to help with your explanation.
 - What is a p-type semiconductor and explain how it improves the conductivity of silicon. Create a diagram to help with your explanation.
 - What is a p-n junction and explain how it is able to convert alternating current into pulsating direct current. Create diagrams to help with your explanation.