

1. How can the principles of material science be leveraged to design a new generation of sustainable B.Tech. products that not only exhibit superior mechanical properties but also minimize environmental impact throughout their lifecycle?
2. How do the current Information Technology regulations in 2021 impact the design and development of advanced materials for high-tech applications, and what considerations must material scientists take into account to ensure compliance with these regulations while pushing the boundaries of innovation in the field?
3. Challenging Question: How can the principles of materials science and engineering be applied to design innovative polymer composites with superior mechanical properties, and what are the potential real-world applications of such advanced materials in enhancing sustainability and performance across various industries?
4. How do the microstructure and composition of dielectric materials influence their dielectric properties and ultimately determine their suitability for specific applications in electrical engineering and electronic devices?
5. Challenging Question: How does the concept of crystallinity, particularly in polycrystalline materials, impact mechanical, thermal, and electronic properties compared to amorphous and single crystal materials? Provide specific examples to support your explanation and discuss the relevance of this understanding in material science applications.
6. How do the concepts of crystal symmetry, close packing in solids, and coordination of atoms interplay with each other to influence the formation and properties of different types of imperfections (e.g., point defects, dislocations, grain boundaries) in crystalline materials? Provide a comprehensive analysis that highlights the role of crystallographic structures in determining the

behavior and stability of materials at the atomic scale.