

Solid state (Assignment – II)

1. A compound is formed by two elements M and N. The element N forms *ccp* and atoms of M occupy $1/3^{\text{rd}}$ of tetrahedral voids. What is the formula of the compound?
2. Which of the following lattices has the highest packing efficiency (i) simple cubic (ii) body-centred cubic and (iii) hexagonal close-packed lattice?
3. An element with molar mass $2.7 \times 10^{-2} \text{ kg mol}^{-1}$ forms a cubic unit cell with edge length 405 pm. If its density is $2.7 \times 10^3 \text{ kg m}^{-3}$, what is the nature of the cubic unit cell?
4. What type of defect can arise when a solid is heated? Which physical property is affected by it and in what way?
5. What type of stoichiometric defect is shown by:
(i) ZnS (ii) AgBr
6. Explain how vacancies are introduced in an ionic solid when a cation of higher valence is added as an impurity in it.
7. Ionic solids, which have anionic vacancies due to metal excess defect, develop colour. Explain with the help of a suitable example.
8. A group 14 element is to be converted into n-type semiconductor by doping it with a suitable impurity. To which group should this impurity belong?
9. What type of substances would make better permanent magnets, ferromagnetic or ferrimagnetic. Justify your answer.
10. Define the term 'amorphous'. Give a few examples of amorphous solids.
11. What makes a glass different from a solid such as quartz? Under what conditions could quartz be converted into glass?
12. Classify each of the following solids as ionic, metallic, molecular, network (covalent) or amorphous.
(i) Tetra phosphorus decoxide (P_4O_{10}) (vii) Graphite
(ii) Ammonium phosphate ($\text{NH}_4)_3\text{PO}_4$ (viii) Brass
(iii) SiC (ix) Rb
(iv) I_2 (x) LiBr
(v) P_4 (xi) Si