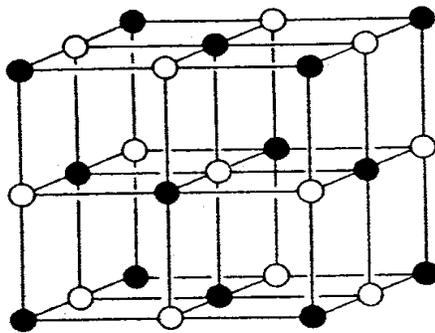


- If atoms are considered as touching hard spheres, determine the "packing fraction" (ratio of volume inside atomic spheres to total volume) for
 - the bcc lattice,
 - the fcc lattice,
 - the sc lattice,
 - the hcp lattice,
 - the diamond lattice.

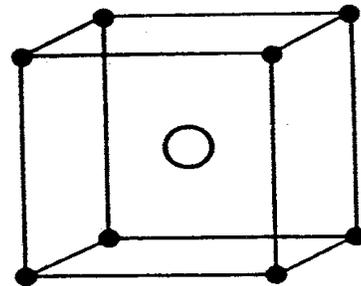
Give the exact answer and the approximate value (*i.e.* 0.68 for the bcc lattice).

- Atoms introduced into a crystal at other than proper lattice sites are called *interstitial atoms*. Given the bcc structure formed by packing of hard spheres, what is the largest sphere that can be introduced at an interstitial site without distorting the original lattice? Where is the site located?

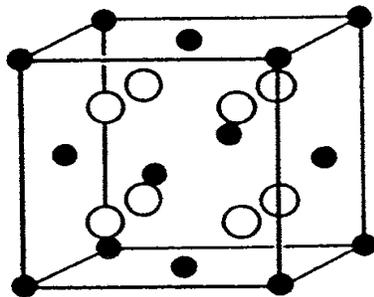
- Determine the Bravais lattice type and the appropriate basis for the crystal structures shown below.



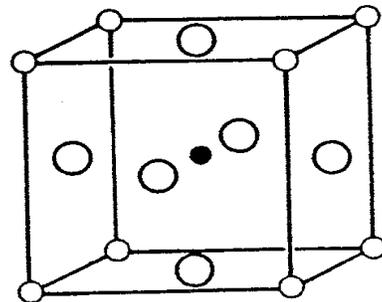
(a)



(b)



(c)



(d)

Common crystal structures: (a) NaCl; (b) CsCl; (c) fluorite (CaF_2); (d) perovskite