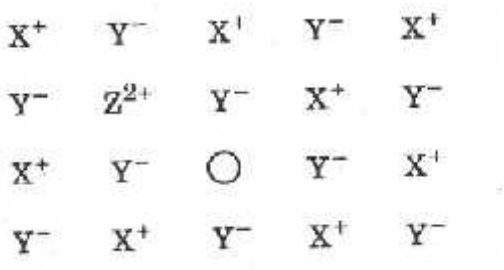
INDIAN SCHOOL DARSAIT
DEPARTMENT OF CHEMISTRY

Subject : CHEMISTRY Topic : SOLID STATE Date of Worksheet : 27. 3.2017

Resource Person: SREEKALA M Date : _____

Name of the Student :_____ Class & Division : XII Roll Number :--------

1	How many atoms are there in one unit cell of a i) body centered cubic crystal ii) face-centered cubic crystal iii) simple cubic crystal	1
2	What is meant by an 'intrinsic semiconductor'?	1
3	"Crystalline solids are anisotropic in nature" What does it mean?	
4	What type of alignment in crystals makes them ferromagnetic?	1
5	State a feature to distinguish a metallic solid from an ionic solid. How do they differ in conducting electricity?	1
6	Why LiCl acquire pink colour when heated in Li vapours?	1
7	What are 12-16 and 13-15 compounds?	1
8	What is the effect of Schottky and Frenkel defects on the density of crystalline solids?	1
9	What happens when a ferromagnetic substance is subjected to high temperature?	1
10	Calculate the efficiency of packing in case of a metal crystal for cubic close packed structure	2
11	Give reason a) Why is Frenkel defect found in AgCl? b) What is the difference between Phosphorous doped semiconductor and Boron doped semiconductor?	2
12	KF has ccp structure. Calculate the radius of unit cell if the side of the cube or edge length is 400pm. How many F^- ions and octahedral voids are there in this unit cell?	2
13	What is a semiconductor? Describe the two main types of semiconductor.	2
14	What is the radius of sodium if it crystallises in bcc structure with the cell edge of 400pm?	2
15	Sodium crystallizes in a bcc unit cell. Calculate the approximate number of unit cells in 9.2 g of sodium? (Atomic mass of Na=23u)	3
16	Iron has a body-centered cubic unit cell with a cell edge of 286.6 pm. The density of iron is 7.87 gcm^{-3}. Use this information to calculate Avogadro's number. (Atomic mass of Fe = 56 g mol^{-1}) .	3
17	Silver crystallizes in a fcc lattice. If edge length of the cell is 4.07 x 10^{-8}cm and density of silver is 10.5gcm^{-3}. Calculate the atomic mass of silver, on this basis.	3

18	Explain the following giving a suitable example in each case: i) Frenkel defect ii) F-centres iii) Paramagnetism	3
19	How would you account for the following: i)Frenkel defects are not found in ionic solids of nearly equal sizes of cations and anions ii)Schottky defects lower the density of a crystalline solid. iii)Impurity doped silicon is a semiconductor.	3
20	Silver crystallises with face-centered cubic unit cell. Each side of this unit cell has a length of 409 pm. What is the radius of silver atom?	3
21	Aluminium crystallises in a cubic close-packed structure. Radius of the atom in the metal is 125pm (i) What is the length of the side of the unit cell? (ii) How many unit cells are there in 1.00 cm^3 of aluminium?	3
22	The well known mineral fluorite is chemically calcium fluoride. It is known that in one unit cell of this mineral there are 4 Ca^{2+} ions and 8 F^- ions and that Ca^{2+} ions are arranged in a fcc lattice. The F^- ions fill all tetrahedral holes in the fcc cubic centered lattice of Ca^{2+} ions. The edge of the unit cell is 5.46×10^{-8} cm in length. The density of the solid is $3.18 gcm^{-3}$. Use this information to calculate Avogadro's number (Molar mass of CaF_2= $78.08 gmol^{-1}$)	3
23	The density of copper metal is $8.95 gcm^{-3}$. If the radius of copper atom is 127.8 pm, is the copper unit cell a simple cubic, a body-centered cubic or a face-centered cubic structure? (Atomic mass of copper=$63.54 gmol^{-1}$ and $N_A = 6.02 \times 10^{23}$ mol^{-1})	3
24	An element crystallises in a structure having a bcc unit cell of an edge length 316pm. Calculate its density if 50g of the element contains 1.64×10^{23} atoms.	3
25.	An element A crystallises in fcc structure. 100g of this element has 2.06×10^{24} atoms. The density of A is $7.2 gcm^{-3}$. Calculate the edge length of the unit cell.	3
26.	Examine the given defective crystal.  i) Write the term used for this type of defect. ii) What is the result when XY crystal is doped with divalent (Z^{2+}) impurity?	2