Class : XII
Solid State (Chemistry)(Test)

very short questions

1 (a) Classify following as ionic, metallic, molecular & covalent solids and also mention the inter particle force present in them: -
(i) I_2 (ii) Quartz (iii) CaF_2 (iv) Ice (v) SO_2 (vi) Cu
(b) Give the significance of lattice point.
(c) Name a substance that can be added to AgCl so as to produce cation vacancies.
(d) Name a substance that can be added to NaCl so as to produce cation vacancies?
(e) Name an element which may be added to silicon to make electrons available for conduction of an electric current?
(f) Mention one property, which is caused due to the presence of F - center in a solid.
(g) What is the packing pattern of HCP & CCP? Give their coordination number.
(h) What are Bravais lattices?

2 .Explain following
(a) Schottky defect
(b) Para magnetism
(c) Frenkel defect
(d) 13 -15 compounds.

3.How does doping of a NaCl crystal with $SrCl_2$ change its structure? Which property will be attributed to this?

Reasoning questions

4.Explain the following
(a) Window glass panes of old building are slightly thicker at the bottom.
(b) AgCl does not show Schottky defect
(c) Ancient glass objects appear to be milky
(d) Amorphous solids do not have well defined melting points
(e) Silicon is an insulator but silicon doped with phosphorus acts as a semiconductor
(t) ZnO on heating turns yellow.
(g) On heating crystals of KCl in potassium vapour, the crystals start exhibiting violet colour.
(h) Frenkel defect does not change the density of AgCI crystals
(i) Frenkel defects are not found in alkali metal halides.
G) Schottky defect lower the density of related solids
(k) Impurity doped silicon is a semiconductor.

5.Differentiate between the following giving suitable examples:
(a) Crystalline & amorphous solids
(b) Ferromagnetic & Ferrimagnetic substances
(c) Paramagnetic & diamagnetic substances
(d) p-type & n-type semiconductors

Numericals

6.A compound is made up of elements A & B. Atom A makes hcp OR ccp lattice, what is the formula of
compound if B occupies:
(a) Octahedral voids [AB]

(b) 2/3'd of total tetrahedral voids [A_3B_2]
(c) l/3'd of the tetrahedral voids [A_3B_2]
(d) 2/3'd of the octahedral voids [A_3B_2]

7.An element has BCC structure with a cell edge of288pm The density of the element is 7.2 g/cc. How
many atoms are present in 208 g of element? (24.188 x 10^{23})

8.Analysis shows that nickel oxide has the formula $Ni_{098}O_{1.00}$. What fraction of Ni exists as Ni^{2+} and Ni^{3+}
ions? [Ni^{+2} = 96 % and Ni^{+3} = 4 %]

9.The density of chromium metal is 7 .2 g/cc. If the unit cell is 288 pm, determine the type of the unit cell.
(simple, bcc or fcc). {At mass Cr = 52 amu] [BCC]

10. An element A crystallizes in FCC structure. 200 g of this element has 4.12 x 10^{24} atoms. The density of A is 7.2 g/cc. Calculate the edge length of the unit cell. [300 pm]

11. Copper crystallises in a cubic structure. The density of a copper is 8.96 g/cm3 and radius of the copper atom is 128 pm. In which type of cubic lattice (simple or fcc or bcc) the copper crystallises. (At mass of Cu= 63.5 and NA= 6.02 x 10^{23}mol)

Value based question
12. Tina look Sheena to her ancestral house in a village. The house was more than 100years old . both observed that glass panes fixed to windows were thicker at the bottom than the top. Also, they observed that some glass object were milky in appearance.

(a) Why glass panes fixed to window were slightly thicker at the bottom?
(b) Why were some glass object milky in appearance?
(c) What value are shown by Tina and Sheena?