Level-I

(1.) effective number of atom from corner = 01

Four body-diagonal each having 2 atom = 08

∴ Total effective number of atom = 09

(2) NaCl is in rock salt structure

∴ total no of Cl^- are (8 from corner, 6 from face center) = 14

and total no of Na^+ are (12 from edge center and one in body center) = 13

So if $Cl^- = 13$, $Na^+ = 14$ (Vice-Versa)

(3) The effective number of Cu = $8 \times \frac{1}{8} + 6 \times \frac{1}{2} = 04$

" " " Ag = $12 \times \frac{1}{4} = 3$

" " " Au = 01

∴ $Cu_4 Ag_3 Au$

(4) $$d = \frac{Z \times M.W}{6.023 \times 10^{23} \times (654 \times 10^{-10}\ cm)^3}$$

$$2.75 = \frac{Z \times 119}{6.023 \times 10^{23} \times (654 \times 10^{-10})^3}$$

$$Z = 4$$

(5) F.C.C consist of 4 atom in one unit cell

(6) In Zinc blende

B^- in F.C.C = 04

A^+ in 25% T.V = $8 \times \frac{1}{4} = 02$

∴ $A_2B_4 = AB_2$

7. In body center cubic unit cell the co-ordination number of each atom is 8

$\therefore \quad 8:8 = CsCl = B.C.C$

8. $$10 = \frac{4 \times \text{At-wt}}{6.023 \times 10^{23} \times (200 \times 10^{-10})^3}$$

$\text{At.wt} = 12$

$\therefore \quad \frac{100}{12} \times 6.023 \times 10^{23} \text{ atom} = 5 \times 10^{24}$

(9) one unit cell of bcc = 02 atoms

$2 \times \underline{12.08 \times 10^{23}} = 24.16 \times 10^{23}$ atom

(10) $$D = \frac{Z \times \text{At wt}}{N_A \times (a)^3}$$

$D \propto Z$

If Z increase D also increase

(11) $\frac{\sqrt{3}a}{2} = 1.73$

$a = \frac{1.73 \times 2}{\sqrt{3}} A^\circ$

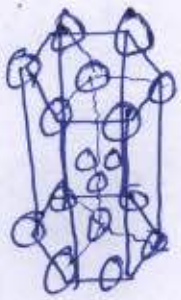
$= 200 \text{ pm}.$

13 $\frac{r^+}{r^-} = .414$

$\frac{100}{y^-} = .414$

$y^- = \frac{100}{.414}$

$= 241.5 \text{ Pm}$

14 

the effective no of atom = 06

15 Z in FCC = 4

X in T.V = 8

$Z_4X_8 = X_2Z$

16 ionic crystal

17 Ionic crystal

18 $3.4 = \frac{4 \times \text{Cacl}}{6.023\times10^{23} \times (a)^3}$

$a = 5.783$

19 $1.9893 = \frac{4 \times KCl}{\cancel{6.023\times10^{23}} \times N_A \times (6.27082 \times 10^{-8})^3}$

$N_A = 6.023\times10^{23}$

20 $2r_{Li} + 2r_{Cl^-} = 5.14A^\circ$ —— (I)

$\frac{r_{Li}}{r_{Cl^-}} = .414$ —— (II)

by solving (I) and (II)

$Cl^- = 1.815A^\circ$

21. All shows Frenkel defect.

22. As and B creats F-center defects

23. $$d = \frac{2 \times 23}{6.023 \times 10^{23} \times (4.24 \times 10^{-8})^3}$$

$$= 1.002 \text{ gm cm}^{-3}$$

24. Schottky defect is noticed in all

25. CsCl consist of $\frac{1}{2} Cs^+$ and $\frac{1}{2} Cl^-$

26. Fe

27. All (Refer text)

28. nearest neighbour are the atom which touch each other
∴ in FCC Co-ordination number = 12

29. 6

30. $$d = \frac{2 \times 100}{(6.023 \times 10^{23})(400 \times 10^{-10})^3}$$

$$d = 5.19 \text{ gm/cm}^3$$

(31) $$\frac{\sqrt{3}\, a}{2} = 1.73$$

$$a = \frac{1.73 \times 2}{\sqrt{3}} \text{ A}^\circ = 2.00 \text{ pm}$$

32. $$2A^+ + 2B^- = 400$$

$$2 \times 75 + 2B^- = 400$$

$$B^- = 125$$

33 distance between Cs^+ and Br^-

$$\frac{\sqrt{3}a}{2} = \frac{\sqrt{3} \times 400}{2} = 346.4 \text{ pm}$$

34 Packing fraction of BCC $= \frac{\sqrt{3}\pi}{8}$

Co-ordination $= 8$

35 effective no of $A = 1$

" " " $B = 6 \times \frac{1}{2} = 3$

AB_3

36 Covalent solid.

37 3 (refer text)

38 Molecular solid

39 ABC - ABC is cubic close packing

40 RbBr is greater than NaF.

41 $2A^+ + 2B^- = 400$

$2 \times 75 + 2B^- = 400$

$B^- = 125$ pm.

42 In Simple cubic lattice $a = 2r$

bcc $= \frac{\sqrt{3}a}{4}$

FCC $= \frac{a}{2\sqrt{2}}$.

43 $\frac{Ag^+}{I^-} = \frac{126}{216} = \frac{r^+}{r^-}$

Co-ordinate number = 6

44 $\frac{95}{181} = .414 = \frac{r^+}{r^-}$

Co-ordinate Number = 6

45 $\frac{Rb^+}{I^-} = \frac{1.41}{2.16} = .414$

∴ Co-ordination = 6, NaCl

46 One BCC = 02 atoms

$2 \times \frac{12.08 \times 10^{23}}{\cancel{00}} = 24.16 \times 10^{23}$

47 ~~effective M = 1~~ MF_2

48 all of these (Hyper teat)

49 (3)

50 All.