Single Correct Answer Type

1. A solid has a structure in which W atoms are located at the corners of a cubic lattice, O atom at the centre of the edges and Na atom at centre of the cubic. The formula for the compound is
(A) $NaWO_2$ (B) $NaWO_3$ (C) Na_2WO_3 (D) $NaWO_4$

2. The density of CaF_2 (fluorite structure) is 3.18 g/cm^3. The length of the side of the unit cell is
(A) 253 pm (B) 344 pm (C) 546 pm (D) 273 pm

3. The coordination number of cation and anion in Fluorite CaF_2 and CsCl are respectively
(A) 8 : 4 and 6 : 3 (B) 6 : 3 and 4 : 4 (C) 8 : 4 and 8 : 8 (D) 4 : 2 and 2 : 4

4. If the anions (A) form hexagonal closest packing and cations (C) occupy only 2/3 octahedral voids in it, then the general formula of the compound is
(A) CA (B) CA_2 (C) C_2A_3 (D) C_3A_2

5. A solid is formed and it has three types of atoms X, Y, Z. X forms a FCC lattice with Y atoms occupying all the tetrahedral voids and Z atoms occupying half the octrahedral voids. The formula of the solid is
(A) X_2Y_4Z (B) XY_2Z_4 (C) X_4Y_2Z (D) X_4YZ_2

6. A compound XY crystallizes in BCC lattice with unit cell edge length of 480 pm. If the radius of Y^- is 225pm, then the radius of X^+ is
(A) 127.5 pm (B) 190.68 pm (C) 225 pm (D) 255 pm

7. An ionic compound AB has ZnS type structure. If the radius A^+ is 22.5 pm, then the ideal radius of B would be
(A) 54.35 pm (B) 100 pm (C) 145.16 pm (D) none of these

8. Which of the following will show schottky defect
(A) CaF_2 (B) ZnS (C) AgCl (D) CsCl

9. In a compound, AB the ionic radii of A^+ and B^- are 88 pm and 200 pm respectively. The coordination number of A^+ is
(A) 4 (B) 6 (C) 10 (D) 12

10. In the bcc structure of potassium (at. wt. 39), the nearest neighbour distance is 452 pm. Its density will be
(A) $302.3 kgm^{-3}$ (B) $604.6 kgm^{-3}$ (C) $910 kgm^{-3}$ (D) None of these

11. The appearance of colour in solid alkali metal halides is generally due to
(A) Frenkel defect (B) F-centres (C) Schottky defect (D) Interstitial position

12. Which one of the following statements about packing in solids is incorrect?
(A) Void space in ccp mode of packing is 26%
(B) Coordination number in hcp mode of packing is 12
(C) Void space in hcp mode of packing is 32%
(D) Coordination number in bcc mode of packing is 8

13. In a face centred cubic lattice, atom A occupies the corner positions and atom B occupies the face centre positions. If one atom of B is missing from one of the face centred points, the formula of the compound is
(A) A_2B_3 (B) A_2B_5 (C) A_2B (D) AB_2

14. A metal crystallises into two cubic planes, face centred cubic (f.c.c) and body centred cubic (b.c.c) whose unit cell lengths are 3.5 and 3.0Å respectively. Calculate the ratio of densities of f.c.c and b.c.c
(A) 1.36 (B) 1.26 (C) 2.26 (D) 3.26

15. In a meal oxide, the metal ions occupy two third of the octahedral voids while oxide ions are arranged in hexagonal close packing. The metal oxide formula will be
(A) M_2O (B) M_2O_{15} (C) M_2O_3 (D) MO_2

16. Calculate the formula of a compound if its structure has sodium atoms at the cube centres, oxygen atoms at the cube edges while tungsten (W) atoms are located at the corners of the unit cell.
(A) $NaWO_2$ (B) $NaWO_3$ (C) Na_2WO_3 (D) $NaWO_4$

17. The number of octahedral sites for sphere in a cubic closest-packed (face-centred cubic) structure are
(A) One (B) Two (C) Three (D) Four

18. An ionic compound has a unit cell constituting of A ions at the corners of a cube and B ions on the centres of the faces of the cube. The empirical formula for this compound will be
(A) AB (B) A_2B (C) AB_3 (D) A_3B

19. Total volume of atoms present in a face centred cubic unit cell of a metal is (r is atomic radius)
(A) $\frac{20}{3}\pi r^3$ (B) $\frac{24}{3}\pi r^3$ (C) $\frac{12}{3}\pi r^3$ (D) $\frac{16}{3}\pi r^3$

20. A metal of atomic mass = 75 forms a cubic lattice of edge length 5Å and density $2 g cm^{-3}$. The radius of atom (Avogadro's number, $N_A = 6 \times 10^{23}$) is
(A) 217 pm (B) 100 pm (C) 217Å (D) None of these

Numerical based

21. A compound P_2Q has wurtzite structure. Calculate its density if edge length of its unit cell is 5.9Å. (At. wt. $P = 30, Q = 38$) (in $g\ cm^{-3}$)

22. Composition of sample of wurtzite is $Fe_{0.93}O_{1.0}$. What percentage of iron is present in the form of Fe(III)?

23. An analysis shows that nicked oxide has the formula $Ni_{0.98}O$. Calculate the fractions of Ni^{2+} and Ni^{3+} present in it.

24. An unknown metal crystallises in two phases, i.e., fcc and bcc with unit length of 3.5 and 3Å respectively. Find the ratio of density of fcc and bcc.

25. A unit cell of sodium chloride has four formula units. The edge length of the unit cell is 0.564 nm. What is the density of sodium chloride? (in $g cm^{-3}$)

KEY

1.	B	**2.**	C	**3.**	C	**4.**	D	**5.**	A
6.	B	**7.**	B	**8.**	D	**9.**	B	**10.**	C
11.	B	**12.**	C	**13.**	B	**14.**	B	**15.**	C
16.	B	**17.**	A	**18.**	C	**19.**	D	**20.**	A
21.	3.169	**22.**	15.05	**23.**	4.1	**24.**	1.259	**25.**	2.16

❇ *Wish You all the Best* ❇