

Holiday (Summer Vacation) Home Work

Subject-Chemistry Class-XII (2021-2022)

1. Calculate the packing efficiency of a metal crystal for Simple cubic lattice, BCC lattice & FCC lattice.

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2. An element with molar mass $2.7 \times 10^{-2} \text{ kg mol}^{-1}$ forms a cubic unit cell with edge length 405 pm. If its density is $2.7 \times 10^{-3} \text{ kg m}^{-3}$, what is the nature of the cubic unit cell?

3. Explain the following terms with suitable examples:

1. Schottky defect

2. Frenkel defect

3. Interstitial defect

4. F-centres.

4. Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering of vapour pressure.

5. Boiling point of water at 750 mm Hg is 99.63°C . How much sucrose is to be added to 500 g of water such that it boils at 100°C .

6. Two elements A and B form compounds having formula AB_2 and AB_4 . When dissolved in 20g of benzene (C_6H_6), 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar depression constant for benzene is $5.1 \text{ K kg mol}^{-1}$. Calculate atomic masses of A and B.

7. Calculate the emf of the cell in which the following reaction takes place: $\text{Ni(s)} + 2\text{Ag}^+ (0.002 \text{ M}) \rightarrow \text{Ni}^{2+} (0.160 \text{ M}) + 2\text{Ag(s)}$ Given that $E^0 (\text{cell}) = 1.05 \text{ V}$.

8. Write the discharging & recharging reaction of lead storage battery.

9. Define the following:

i) Limiting molar conductivity

ii) Fuel cell

iii) Kohlrausch's law

10. Define molar conductivity of a substance & describe how for weak & strong electrolyte molar conductivity changes with concentration of solute.

11. Three electrolytic cells A, B, C containing solutions of ZnSO_4 , AgNO_3 and CuSO_4 , respectively are connected in series. A steady current of 1.5 amperes was passed

through them until 1.45 g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were deposited?

12. Explain the following with suitable example:

i). Ferromagnetism

ii). Paramagnetism

iii). Ferrimagnetism

iv) Antiferromagnetism

v). 12-16 and 13-15 group compounds.

13. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at $25^\circ C$, assuming that it is completely dissociated.

14. State & explain Raoult's law for relative lowering of vapour pressure.

15. a) State Henry's law & write its two applications.

b) Concentrated nitric acid used in laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of acid if the density of the solution is 1.504 gm/ml ?