

NEET SOLID STATE — PACKING EFFICIENCY — PYQS

Max. Marks: 56

Questions: 14

Section A (MCQ) — 14 questions

Q.1 A compound is formed by two elements A and B. The element B forms cubic close packed structure and atoms of A occupy $\frac{1}{3}$ of tetrahedral voids. If the formula of the compound is A_xB_y , then the value of $x + y$ is in option [NEET (UG) 2023]

- (1) 4 (2) 3 (3) 2 (4) 5

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Q.2 What fraction of one edge centred octahedral void lies in one unit cell of fcc? [NEET (UG) 2023]

- (1) $\frac{1}{3}$ (2) $\frac{1}{4}$ (3) $\frac{1}{12}$ (4) $\frac{1}{2}$

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Q.3 Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are : [NEET (UG) 2021]

- (1) 12, 6 (2) 8, 4 (3) 6, 12 (4) 2, 1

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Q.4 The ionic radii of A^+ and B^- ions are 0.98×10^{-10} m and 1.81×10^{-10} m. The coordination number of each ion in AB is [NEET 2016 (Phase 1)]

- (1) 8 (2) 2 (3) 6 (4) 4

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Q.5 In calcium fluoride, having the fluorite structure, the coordination numbers for calcium ion (Ca^{2+}) and fluoride ion (F^-) are [NEET 2016 (Phase 2)]

- (1) 4 and 2 (2) 6 and 6 (3) 8 and 4 (4) 4 and 8

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Q.6 The vacant space in bcc lattice unit cell is [AIPMT 2015]

- (1) 48% (2) 23% (3) 32% (4) 26%

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Q.7 Structure of a mixed oxide is cubic close packed (ccp). The cubic unit cell of mixed oxide is composed of oxide ions. One fourth of the tetrahedral voids are occupied by divalent metal A and the octahedral voids are occupied by a monovalent metal B. The formula of the oxide is [AIPMT 2012 (Mains)]

- (1) ABO_2 (2) A_2BO_2 (3) $A_2B_3O_4$ (4) AB_2O_2

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Q.8 The number of octahedral void(s) per atom present in a cubic close-packed structure is [AIPMT 2012 (Prelims)]

- (1) 1 (2) 3 (3) 2 (4) 4

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Q.9 A solid compound XY has NaCl structure. If the radius of the cation is 100 pm, the radius of the anion (Y^-) will be [AIPMT 2011 (Mains)]

- (1) 275.1 pm (2) 322.5 pm
(3) 241.5 pm (4) 165.7 pm

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Q.10 Percentage of free space in a body centred cubic unit cell is [AIPMT 2008]

- (1) 34% (2) 28% (3) 30% (4) 32%

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Q.11 Which of the following statements is not correct? [AIPMT 2008]

- (1) The number of carbon atoms in a unit cell of diamond is 8
(2) The number of Bravais lattices in which a crystal can be categorized is 14
(3) The fraction of the total volume occupied by the atoms in a primitive cell is 0.48.
(4) Molecular solids are generally volatile.

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Q.12 If a stands for the edge length of the cubic systems: simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these systems will be respectively [AIPMT 2008]

- (1) $\frac{1}{2}a : \frac{\sqrt{3}}{2}a : \frac{\sqrt{2}}{2}a$ (2) $1a : \sqrt{3}a : \sqrt{2}a$
 (3) $\frac{1}{2}a : \frac{\sqrt{3}}{4}a : \frac{1}{2\sqrt{2}}a$ (4) $\frac{1}{2}a : \sqrt{3}a : \frac{1}{\sqrt{2}}a$

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Q.13 The fraction of total volume occupied by the atoms present in a simple cubic unit cell is [AIPMT 2007]

- (1) $\frac{\pi}{3\sqrt{2}}$ (2) $\frac{\pi}{4\sqrt{2}}$ (3) $\frac{\pi}{4}$ (4) $\frac{\pi}{6}$

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Q.14 When Zn converts from melted state to its solid state, it has hcp structure, then find the number of nearest atoms. [AIPMT 2001]

- (1) 6 (2) 8 (3) 12 (4) 4

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full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	2	1	3	3	3	4	1	3	4	3
Ques.	12	13	14								
Ans.	3	4	3								