

NEET SOLID STATE — DENSITY CALCULATIONS — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

- Q.1** Copper crystallises in fcc unit cell with cell edge length of 3.608×10^{-8} cm. The density of copper is 8.92 g cm^{-3} . Calculate the atomic mass of copper.

[NEET (UG) 2022]

- (1) 63.1 u (2) 31.55 u (3) 60 u (4) 65 u

 Scan or tap for the
full solution


- Q.2** Iron exhibits bcc structure at room temperature. Above 900°C , it transforms to fcc structure. The ratio of density of iron at room temperature to that at 900°C (assuming molar mass and atomic radii of iron remains constant with temperature) is

[NEET 2018]

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

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- Q.3** Lithium has a bcc structure. Its density is 530 kg m^{-3} and its atomic mass is 6.94 g mol^{-1} . Calculate the edge length of a unit cell of lithium metal. ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

[NEET 2016 (Phase 1)]

- (1) 527 pm (2) 264 pm (3) 154 pm (4) 352 pm

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- Q.4** A given metal crystallises out with a cubic structure having edge length of 361 pm. If there are four metal atoms in one unit cell, what is the radius of one atom?

[AIPMT 2015 (Cancelled)]

- (1) 80 pm (2) 108 pm (3) 40 pm (4) 127 pm

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- Q.5** A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm^{-3} . The molar mass of the metal is (N_A Avogadro's constant = $6.02 \times 10^{23} \text{ mol}^{-1}$)

[NEET 2013]

- (1)
- 27 g mol^{-1}
- (2)
- 20 g mol^{-1}
-
- (3)
- 40 g mol^{-1}
- (4)
- 30 g mol^{-1}

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- Q.6** A metal crystallises with a face-centred cubic lattice. The edge of the unit cell is 408 pm. The diameter of the metal atom is [AIPMT 2012 (Prelims)]
 (1) 288 pm (2) 408 pm (3) 144 pm (4) 204 pm

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- Q.7** Sodium has body centred packing. Distance between two nearest atoms is $3.7 \text{ \AA}$. The lattice parameter is [AIPMT 2009]
 (1) $4.3 \text{ \AA}$ (2) $3.0 \text{ \AA}$ (3) $8.6 \text{ \AA}$ (4) $6.8 \text{ \AA}$

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- Q.8** Lithium metal crystallises in a body-centred cubic crystal. If the length of the side of the unit cell of lithium is 351 pm, the atomic radius of lithium will be [AIPMT 2009]

- (1) 151.8 pm (2) 75.5 pm
-
- (3) 300.5 pm (4) 240.8 pm

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- Q.9** Copper crystallises in a face-centred cubic lattice with a unit cell length of 361 pm. What is the radius of copper atom in pm? [AIPMT 2009]

- (1) 157 (2) 181 (3) 108 (4) 128

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- Q.10** If the lattice parameter for a crystalline structure is $3.6 \text{ \AA}$, then the atomic radius in fcc crystal is [AIPMT 2008]

- (1)
- $2.92 \text{ \AA}$
- (2)
- $1.27 \text{ \AA}$
- (3)
- $1.81 \text{ \AA}$
- (4)
- $2.10 \text{ \AA}$

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- Q.11** CsBr crystallises in a body centered cubic lattice. The unit cell length is 436.6 pm. Given that the atomic mass of Cs = 133 and that of Br = 80 amu and Avogadro number being $6.02 \times 10^{23} \text{ mol}^{-1}$, the density of CsBr is [AIPMT 2006]

- (1)
- 4.25 g cm^{-3}
- (2)
- 42.5 g cm^{-3}
-
- (3)
- 0.425 g cm^{-3}
- (4)
- 8.25 g cm^{-3}

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Q.12 Copper has face centered cubic (fcc) lattice with interatomic spacing equal to $2.54 \text{ \AA}$. The value of lattice constant for this lattice is [AIPMT 2005]

- (1) $2.54 \text{ \AA}$ (2) $3.59 \text{ \AA}$ (3) $1.27 \text{ \AA}$ (4) $5.08 \text{ \AA}$

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full solution



ANSWER KEY

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