CHEMISTRY

NCERT - NCERT CHEMISTRY (GUJRATI)

THE SOLID STATE - I

Example

1. Calculate the Miller indices of crystal planes which cut through the crystal axes at (i) (2a,

3b, c) (ii) (a, b, c) (iii) (6a, 3b, 3c) and (iv) (2a, -3b, -3c).

2. How do the spacings of the three planes (100), (110) and (111) of cubic lattice vary?

3. A metallic element exists as a cubic lattice. Each edge of the unit cell is 2.88 Å . The

density of the metal is 7.20 g cm^{-3}. How many unit cells there will be in 100g of the metal?

4. Calculate the number(n) of atoms contained within (i) a primitive cubic unit cell (ii) a body – centred cubic unit cell and (iii) a face-centred cubic (f.c.c) unit cell

5. At room temperature, pollonium crystallizes in a primitive cubic unit cell. If a = 3.36 Å, calculate the theoretical density of pollonium, its atomic mass is 209 g mol^{-1}.

Problems

1. Calculate the number(n) of atoms contained within (i) a primitive cubic unit cell (ii) a body –

centred cubic unit cell and (iii) a face-centred cubic (f.c.c) unit cell

2. How do the spacings of the three planes (100), (101) and (111) of simple cubic lattice vary?

3. How do the spacings of the three planes (001), (011) and (111) of bcc lattice vary ?

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4. How do the spacings of the three planes (010), (110) and (111) of fcc lattice vary?

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Questions Choose The Best Answer

1. The structure of sodium chloride crystal is:

A. body centred cubic lattice

B. face centred cubic lattice

C. octahedral

D. square planar

Answer: B

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2. Calculate the number(n) of atoms contained within (i) a primitive cubic unit cell (ii) a body – centred cubic unit cell and (iii) a face-centred cubic (f.c.c) unit cell

A. 4

B. 3

C. 2

D. 1

Answer: A

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3. The 8:8 type of packing is present in:

A. CsCl

B. KCl

C. NaCl

D. MgF_2

Answer: A

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4. In a simple cubic cell, each point on a corner is shared by

A. 2 unit cells

B. 1 unit cells

C. 8 unit cells

D. 4 unit cells

Answer: C

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5. An amorphous solid is :

A. NaCl

B. CaF_2

C. glass

D. CsCl

Answer: C

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6. Each unit cell of NaCl consists of 4 chlorine ions and:

A. 13 Na atoms

B. 4 Na atoms

C. 6 Na atoms

D. 8 Na atoms

Answer: B

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7. In a body centred cubic cell, an atom at the body of centre is shared by:

A. 1 unit cell

B. 2 unit cells

C. 3 unit cells

D. 4 unit cells

Answer: A

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8. In the sodium chloride structure, formula per unit cell is equal to

A. 2

B. 8

C. 3

D. 4

Answer: D

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9. In a face centred cubic cell, an atom at the face centre is shared by:

A. 4 unit cell

B. 2 unit cells

C. 1 unit cells

D. 6 unit cells

Answer: B

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1. In NaCl ionic crystal each Na^+ ion is surrounded by -------- Cl^- ions and each Cl^- ion is surrounded by -------- Na^+ ions.

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2. The coordination number of Cs^+ in CsCl crystal is -------

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3. ---------- solids do not possess sharp melting points and can be considered as ------ liquids.

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4. A body centred unit cell has an atom at the each vertex and at --------- of the unit cell.

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5. The three types of cubic unit cells are -------, ----------- and -------

6. A crystal may have a number of planes or axes of symmetry but it possesses only one ----- of symmetry.

7. Amorphous solids that exhibit same physical properties in all the directions are called --------.

8. Crystalline solids that exhibit different physical properties in all directions are called --------.

9. The number of atoms in a single unit cell of cubic close packed sphere is ---------

10. In a body centred cubic cell, an atom at the body of centre is shared by:

11. The Weiss indices of a plane are 1/2, 1/2, 1/2. Its miller indices will be -----and the plane is designated as --------.

12. A plane is parallel to x & z axes and makes unit intercepts along y-axis. Its Weiss indices are --------. Its Miller indices are --------. The plane is designated as -------.

1. The structure of sodium chloride crystal is:

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2. Mention the number of cesium and chloride ions in each unit cell of CsCl

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1. What is the difference between body centred cubic and face centred cubic?

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