



CHEMISTRY

NCERT - NCERT CHEMISTRY(TELUGU)

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).



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



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

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



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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



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5. At room temperature, Polonium (atomic weight 209gmmol^{-1}) crystallises in a primitive cubic unit cell. If $a = 3.36\text{\AA}$, calculate the theoretical density of Polonium..



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Problems

1. How many atoms are there per unit cell in (i) simple cubic arrangement of atoms, (ii) body

centred cubic arrangement of atoms, and (iii) face-centred cubic arrangement of atoms?



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



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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. The number of atoms in a face centred cubic unit cell is:

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 face centred cubic cell, an atom at the face centre 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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Questions Fill In The Blanks

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 -----



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



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



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



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



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



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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 -----.



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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 ----- .



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Questions Write In One Or Two Sentence

1. What governs the packing of particles in crystals?



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2. What is meant by 'unit cell' in crystallography?



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3. How many types of cubic unit cell exist?



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4. What are Miller Indices?



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5. Mention the number of sodium and chloride ions in each unit cell of NaCl



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



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Questions Explain Briefly On The Following

1. Define and explain the following terms

a) Crystalline solids b) Amorphous solids c)

Unit cell



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2. Give the distinguishing features of crystalline solids and amorphous solids.



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3. Explain the terms Isotropy and Anisotropy.



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



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5. Draw a neat diagram for sodium chloride structure and describe it accordingly.



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6. Draw a neat diagram for Cesium chloride structure and describe it accordingly



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