



# CHEMISTRY

## NCERT - NCERT CHEMISTRY(GUJRATI)

### SOLID STATE - II

#### Example

1. Determine the number of formula units of NaCl in one unit cell. NaCl is face centred cubic.



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2. In a fcc arrangement, the corner atoms are A type and those at face centres are B type. What is the simplest formula of the compound ?



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**Problems For Practice**

1. The diffraction of a crystal with X-ray of wavelength  $2.31\text{\AA}$  gives a first order reflection at  $28^{\circ}.9'$ . What is the distance between the diffracted planes.



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2. Diffraction angle  $2\theta$  equal to  $14.8^{\circ}$  for a crystal having interplanar distance in the crystal is  $0.400\text{ nm}$  when second order

diffraction was observed. Calculate the wavelength of X-ray used



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3. Find the interplanar distance in a crystal in which a series of planes produce a first order reflection from a copper X-ray tube ( $\lambda = 1.542 \text{ \AA}$ ) at an angle of  $23.2^\circ$ .



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4. The X-ray of wavelength  $1.54\text{Å}$  are incident on a crystal having an interatomic distance of  $1.6\text{Å}$ . Find out the angles at which the first and second order reflection take place.



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5. Calculate the angle at which (a) first order reflection and (b) second order reflection will occur in an X-ray spectrometer when X-ray of wavelength  $1.54\text{Å}$  are diffracted by the

atoms of a crystal, given that the interplanar distance is  $4.04\text{\AA}$ .



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## Self Evaluation A Choose The Correct Answer

1. The number of chloride ions that surrounds the central  $\text{Na}^+$  ion in NaCl crystal is \_\_\_\_\_ .

A. 12

B. 8

C. 6

D. 4

**Answer:**



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2. A regular three dimensional arrangement of identical points in space is called

A. Unit cell

B. Space lattice

C. Primitive

D. Crystallography

**Answer:**



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**3.** The smallest repeating unit in space lattice which when repeated over and over again results in the crystal of the given substance is called



A. Space lattice

B. Crystal lattice

C. Unit cell

D. Isomorphism

**Answer:**



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**4. The crystal structure of CsCl is**

A. Simple cubic

B. face-centred cubic

C. Tetragonal

D. Body centred cubic

**Answer:**



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5. An example for Frenkel defect is

A. NaCl

B. AgBr

C. CsCl

D. FeS

**Answer:**



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6. Semiconductors which exhibit conductivity due to the flow of excess negative electrons are called

A. Super conductors

B. n-type semiconductors

C. p-type semiconductors

D. Insulators

**Answer:**



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7. In the Bragg's equation for diffraction of X-rays, 'n' represents

A. The number of moles

B. Avogadro number

C. A quantum number

D. Order of reflection

**Answer:**



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**8.** The number of close neighbours in a body centred cubic lattice of identical spheres is

A. 6

B. 4

C. 12

D. 8

**Answer:**



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**9.** The crystals which are good conductors of electricity and heat are

A. Ionic crystals

B. Molecular crystals

C. Metallic crystals

D. Covalent crystals

**Answer:**



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

A. One unit cell

B. Two unit cell

C. 8 unit cell

D. 4 unit cell

**Answer:**



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**11.** The ability of certain ultra cold substances to conduct electricity without resistance is called



A. Semiconductor

B. Conductor

C. Superconductor

D. Insulator

**Answer:**



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**12.** 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. 1

B. 2

C. 3

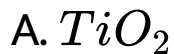
D. 4

**Answer:**



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13. Rutile is



**Answer:**



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14. Semiconductors are used as

A. rectifiers

B. transistors

C. solar cells

D. all the above

**Answer:**



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15. An example of metal deficiency defect

A. NaCl

B. AgCl

C. CsCl

D. FeS

**Answer:**



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## Self Evaluation B Answer In One Or Two Sentences

1. Define the terms, space lattice and unit cell.



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2. Sketch the (a) simple cubic (b) face-centred cubic and (c) body centred cubic lattices.



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3. Give example for molecular and ionic crystals.



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4. What is a vitreous state?



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5. Give two example for AB and  $AB_2$  type ionic crystals.



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## Self Evaluation C Answer Not Exceeding 60 Words

1. Write the properties of ionic crystals.



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