

India's Number 1 Education App

## CHEMISTRY

## **BOOKS - CHEMISTRY**

## **SOLID STATE**



**1.** which of the following favours the existenence of a substance in the solid state ?

- A. High temperature
- B. Low temperature
- C. high thermal enery
- D. Weak cohesive forces

Answer: B



2. which of the following is not a characteristic

of a crystalline solid ?

A. Define and characterstic heat of fusion

B. Isotropic nature

C. A regular periodically repeated pattern

of arrangement of consituent particles

in the entire crystal

D. A true solid

Answer: B

**3.** Which of the following is an amorphous solid?

A. Graphite (C )

B. Quartz glass ( $SiO_2$ )

C. Chrome alum

D. Silicon carbide (SiC)

Answer: B

4. which of the following arrangements shows schematic alignment magnetic moments of antiferromagnetic substances?

- **D.** (d)  $(\uparrow)$   $(\uparrow)$   $(\uparrow)$   $(\uparrow)$   $(\uparrow)$   $(\downarrow)$

#### Answer: D

**5.** which of the following is true about the value of refractive index of quartz glass ?

A. Same in all directions

B. Different in different directions

C. Cannot be measured

D. Always zero

Answer: A

6. Which of the following statement is not true

about amorphous solids?

A. on heating they may become crystalline

at certain temperature

B. they may become crystlline on keeping

for long time

C. Amorphous solids can be moulded by

heating

D. they are aniotropic in a nature

#### Answer: D



**7.** The sharp melting point of crystalline solids compared to amorphous solids is due to

A. a regular arrangement of constituent

partticles observed over a short distance

in the crystal lattice



Answer: B

**8.** Iodine molecules are held in the crystal lattice by:

A. London forces

B. Dipole -dippole interactions

C. Covvalent bonds

D. Coulombic forces

Answer: A

9. which of the following is a network solid?

A.  $SO_2(solid)$ 

 $\mathsf{B.}\,I_2$ 

C. Diamond

D.  $H_2O$  (ice)

Answer: C

10. which of the following solids is not an electrical conductor ? (a) Mg(s) (b) TiO(s) ( c)  $I_2(s)$  (d)  $H_2O(s)$ 

A. only 1

B. only 2

C. 3 and 4

D. 2,3 and 4

Answer: C

**11.** which of the following is not the characteristic of ionic solids?

A. Very low value of electrical conductivity

in the molten state

B. Brittle strong forces of interactions

C. Very strong forces of interactons

D. Anisotropic nature

Answer: A

A. Lone pair of electrons

B. Free Valence electrons

C. Cations

D. anions

Answer: B

**13.** which of the following oxides behaves as conductor or insulator depending upon temperature ?

- A. TiO
- B.  $SiO_2$
- $\mathsf{C}.\,TiO_3$
- D. MgO

#### Answer: C



**14.** which of the following oxides shows electrical properties like metals ?

A.  $SiO_2$ 

B. MgO

 $\mathsf{C.}\,SO_2(s)$ 

D.  $CrO_2$ 

Answer: D

15. The lattice site in a pure crystal cannot be

occupied by:

A. molecule

B. ion

C. electron

D. atom

Answer: C

16. graphite cannot be classifed as .............

A. conducting solid

B. network solid

C. Covalent solid

D. ionic solid

Answer: D

17. Cations are present in the interstitial sites

in .......

A. Frenkel defect

B. Schottky defect

C. Vacancy defect

D. metal deficiency defect

Answer: A

18. Schottky defect is observed in crystals when

A. some cations move from their lattice site

to intersititial sites

B. equal number of cations and anions are

missing form the lattice

C. some lattice sites are occupied by

electrons

D. some impurity is present in the lattice

Answer: B

. . . . . . . . . . . . . . . . . . .



**19.** which of the following is true about the change the charge acquired by p- type semiconductors ?

A. Positive

B. Neutral

C. Neagative

D. Depends on conentraton of p impurity

Answer: B



**20.** to get a n- type semiconductor from silicon , it should be doped with a sustance with

valency.......

- A. 2
- B. 1
- C. 3
- D. 5

Answer: D



### 21. The total of tetrahedral voids in the face

centred unit cell is ............

A. 6

B. 8

C. 10

D. 12

#### **Answer: B**





- **22.** which of the following point defects are shoen by AgBr (s) crystals ?
- (a) Schottky defect
- (b) Frenkel defect
- (c) metal ecxess defect
- (d) Metal deficiency defect
  - A. 1 and 2
  - B. 3 and 4

#### C. 1and 3

D. 2 and 4

Answer: A

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**23.** In which pair most efficient packing is present?

A. Hcp and bcc

B. hcp and ccp

C. bcc and ccp

D. bcc and simple cubic cell

Answer: B

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**24.** Percentage of free space in cubic in a bodycentred cubic unit cell is .

A. 74

B. 68

C. 32

D. 26

#### Answer: C

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**25.** which of the following statemets is not true about the hexagonal close packing ?

A. the coordination number is 12

B. it has 74 % packing efficiency

C. Tetrahedral voids of the second layer are

covered by the sphere of the third layer

D. in this arrangment spheres of the fouth

layer are exactly alingened with those of

the first layer

Answer: D

**26.** in which of the following strutures corrding number for cations and anions in the packed structure will be same ?

A.  $Cl^-$  ions form fcc lattice and  $Na^+$  ions occupy all octahedral voids of the unit cell

B.  $Ca^{2+}$  ions form fcc lattice and  $F^{-}$  ions occupy all the eight tetrahedral voids of the unit cell



**27.** What is the coordination number in a square close packed structures in two dimensions?

A. 2

B. 3

C. 4

D. 6

#### Answer: C



**28.** which kind of defects are introduced by doping ?

A. Dislocation defect

B. Schottky defect

C. Frenkel defect

D. Electronic defect

#### Answer: D

29. silicon doped with electron rich impurity

forms ......

A. p- type semiconductor

B. n- type semicondutor

C. intrinsic semiconductor

D. insulation

Answer: B

**30.** which of the following statements is not true ?

A. Paramagnetic substances are weakly attracted by magnetic field B. Ferromagnetic substance cannot be magnetised permanently C. the domains in antiferromagnetic substance are oppositely oriented with respect to each other



magnetic moment in the diamagnetic

substances

Answer: B

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31. which of the following is not true about the

ionic solids ?

# A. Bigger ions form the close packed structure B. smaller ions either occupy the tetrahedral or the octahedral voids depending upon their size C. Occupation of all voids is not necessary D. the fraction of octahedral or tetrahedral voids occupied depends upon the radii of the ions occupying the voids

Answer: D


**32.** A ferromagnetic substance becomes a permanent magnet when it is placed in a magnetic field because:

A. all the domains get oriented in the direction of magnetic fieldB. all the domains get oriented in the direction opposite to the direaction o

magnetic field

C. Domains get ori ented randomy

D. Domains are not affected by magnetic

field

Answer: A

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33. the correct order of the packing effeciency

in different types of unit cells is ...........

A. fccltBcclt simple cubic

B. fccgt bcc gt simple cubic

C. fcclt bcc? Simple cubic

D. bcclt fccgt simple cubic

Answer: B

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34. which of the follwing defects is also known

as dislocation defect ?

A. Frenkel defect

B. Schottky defect

C. Non-stoichiometric defect

D. simple inter stitial defect

Answer: A

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35. in the cubic packing , the unit cell has ..........

A. 4 tetrahedral voids each of which is

shared by four adjacent unit cells

- B. 4 tetrahedral voids within the unit cell
- C.8 tetrahedral voids each of which is

shared by four adjacent unit cells

D. 8 tetrahedral voids within the unit cells

Answer: D

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A. 
$$2\sqrt{2r}, \frac{4r}{\sqrt{3}}, 2r$$
  
B.  $\frac{4r}{\sqrt{3}}, 2\sqrt{2r}, 2r$   
C.  $2r, 2\sqrt{2r}, \frac{4r}{\sqrt{3}}$   
D.  $2r, \frac{4r}{\sqrt{3}}, 2\sqrt{2r}$ 

#### Answer: A



**37.** which of the following repesents correct order of conductivity in solids ?



**38.** Which of the following is not true about the voids formed in 3 dimensional hexagonal close packed structure?

A. A tetrahedral void is formed when a sphere of the second layer is present above triangular void in the first layer B. all the triangular voids in the first layer C. tetrahedral voids are formed when the triangular voids in the second layer lie

above the first layer and the triangular shpes of these voids do not overlap D. Octahedral voids are formed when the triangular voids in the second layer exctly overlap with similar voids in the first layer

Answer: C,D

**39.** the value of magnetic moment is zero in the case of antiferromagnetic substaence because the domains .........

A. get oriented in the direction of the applied magnetic fleid

B. get oriented opposite to the direction to

the direction of the appiled magnetic

fleld

C. are oppositely oriented with respect to each other without the application of magnetic field

D. cancel out each other 's magnetic

moment

Answer: C,D

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40. which of the following statement are not

true ?

A. Vacancy defect results in a decrease in

the density of the substance

B. interstitial defects results in an increase

in the density of the substance

C. impurity defect has no effect on the

density of the substance

D. Frenkel defect results results I n an

increase in the density of the substance

Answer: C,D

**41.** which of the following statements are true about metals ?

A. Valence band overlaps with conduction band

B. the gap between valence band and conduction band is negligible

C. the gap[ between valence band and

conduction band cannot be determinted

D. Valence band may ramain paratially filled

#### Answer: A,B,D



**42.** under the influence of electric field , which of the following statement is true about the movement of electrons and holes in p- type semiconducter ?

A. Electron will move towards the positively

charged plate through electron holes

B. Holes will appear to be moving towards

the negatively chared plate

C. both electrons and holes appear to

move towards the positively charged

plate

D. Movement of elecrons Is not reated to

the movement of holes

Answer: A,B

**43.** which of the following statements are true about semiconductor ?

A. silicon doped with electron rich impurity

is a type semiconductor

B. Silicon doped with an electrons rich

impuriy is an n-type semipucoter

C. Delocalised electrons increase the

conductivity of doped silicon

D. An electron vacancy incease the

conductivity of n- type semiconductor

#### Answer: B,C



**44.** An excess of potassium ions makes KCL crystals appear violet or lilac in colour since

A. some of the anionic sites are occupied

by an unpaired electron

B. some of the anionic sites are occupied

by an pair of electrons

C. there are vacancies at some anionic sites

D.F - centres are created which impart

colour to the crystals

Answer: A,D

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**45.** the number of tetrahedral voids per unit

cell in NaCl crystal is ............

B. 8

#### C. twice the number of octahedral voids

D. Four times the number of octahedral

voids

Answer: B,C

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46. Amorphous solids can also be callled .....

A. pseudo solids

B. true solids

C. super cooled liquids

D. super cooled solids

Answer: A,C

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**47.** A perfect crystal of silicon (fig) is deped with some elements as given in the options , which of these options shows n- type

#### semicondutors ?











## Answer: A,C



# **48.** which of the following statements are correct ?

A. Ferrimagnetic substance lose

ferrimagnetism on heating and become

paramagetic

B. Ferrimagnetic substance do not lose ferrimagnetism on heating and Reamain ferrmagnetic C. Antiferromgnetic substance have domain structures simolar to ferromagnetic substance and their magngnetic moment are not cancelled by eash other

D. in ferromagnetic substance , all the

domains get oriented in the directon of

magnetic field and ramain as such even

after removing magnetic field

Answer: A,D

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49. which of the following feastures are not

shown by quartz glass ?

A. this is a crystalline solid

B. Refractive index is same in all the

directions

C. this has define heat of fusion

D. this is also called super cooled liquid

Answer: A,C

50. which of the following cannot regarded as

molecular solid ?

A. AiC ( silicon carbide )

B. AIN

C. Diamond

D.  $I_2$ 

Answer: A,B,D

**51.** in which of the following arrangement octahedral voids are formed ?

A. hcp

B. bcc

C. simple cubic

D. fcc

Answer: A,D

52. Frenkel defect is also known as .........

A. Soichiometric defect

B. dislocation defect

C. impurity defect has no effect on the

density of the substance

D. non-stoichometric defect

Answer: A,B

53. which of the following defects decrase the

density decrease the density ?

A. interstitial defect

B. Vacancy defect

C. Frenkel defect

D. Schottky defect

Answer: B,D

54. why are liquids and gases categorised as

fuids ?



**55.** why are solids incomressible ?

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**56.** Inspite of long range order in the arrangement of particles why are the crystals



58. why is FeO(s) not formed in stoichiometric

compostion ?



**59.** why does white ZnO(s) becomes yellow upon heating ?



60. why does the electrical conductivity of

semiconductors increse with rise in

temperature?

**61.** Expalin why does conductivity of germainum crystals increase on doping with galium ?

**62.** A compound formed by two elements M and N. Element N forms ccp and atoms of M occupy 1/3rd of tetrahedral voids. What is the formula of th compound?

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63. Under which situations can an amorphous

substance change to crystaline form?

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#### 64. match the defects given in column I with

#### the statements in given Column I.

	Column I		Column II
A.	Simple vacancy defect	1.	Shown by non-ionic solids and increases density of the solid
В.	Simple interstitial defect	2.	Shown by ionic solids and decreases density of the solid
C.	Frenkel defect	3.	Shown by non-ionic solids and density of the solid decreases
D.	Schottky defect	4.	Shown by ionic solids and density of the solid remains the same



# 65. match the type of unit cell given column I

#### with the features iven in Column II.

	Column I	Τ	Column II
A.	Primitive cubic unit cell	1.	Each of the three perpendicular edges compulsorily have the different edge length <i>i.e.,</i> $a \neq b \neq c$
В.	Body centred cubic unit cell	2.	Number of atoms per unit cell is one
C.	Face centred cubic unit cell	3.	Each of the three perpendicular edges compulsorily have the same edge length <i>i.e.</i> , $a = b = c$
D.	End centred orthorhombic unit cell	4.	In addition to the contribution from the corner atoms the number of atoms present in a unit cell is one
		5.	In addition to the contribution from the corner atoms the number of atoms present in a unit cell is three



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## 66. match the types of defect given in column I

## with the statement given in column II.

	Column I		Column li
Α.	Impurity defect	1.	NaCl with anionic sites called F-centres
В.	Metal excess defect	2.	FeO with Fe <sup>3+</sup>
C.	Metal deficiency defect	3.	NaCl with Sr <sup>2+</sup> and some cationic sites vacant

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# 67. match the items given in column I with the

# items given in column II.

	Column I	Column II		
A.	Mg in solid state	1.	p-type semiconductor	
В.	MgCl <sub>2</sub> in molten state	2.	n-type semiconductor	
C.	Silicon with phosphorus	3.	Electrolytic conductors	
D.	Germanium with boron	4.	Electronic conductors	

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68. Match the type of packing given in column I

with the iterms given in column II.
	Column I		Column II
А.	Square close packing in two dimensions	1.	Triangular voids
<b>B</b> .	Hexagonal close packing in two dimensions	2.	Pattern of spheres is repeated in every fourth layer
С,	Hexagonal close packing in three dimensions	3.	Coordination number = $4$
D.	Cubic close packing in three dimensions	4.	Pattern of sphere is repeated in alternate layers



**69.** Assertion :- (a) the total number of atoms present in a simple cubic unit cell is one . Reasn :-(R ) simple cubic cell has atoms at its corners , each of which is shered between eight adjecent adjeacent unit cells.

A Assertion and reason both are correct statements and Reason is correct explantion for Assertion. B. Asserton and Reason both are correct statement but Reason is not correct explanation for assertion. C. Assertion is correct statement but reason is worng statement. D. Assertion is Wrong statement but Reason is correct statement.

## Answer: A



**70.** Assertion :- (A) Graphite is good conductor of electricity however diamond belongs to the category of insulators .

Rason (R) Grapite is soft in anture on the

hand diamond is very hard and brittle.

A. Assertion and reason both are correct

statements and Reason is correct

explantion for Assertion .

B. Asserton and Reason both are correct statement but Reason is not correct

explanation for assertion .

C. Assertion is correct statement but

reason is worng statement.

D. Assertion is Wrong statement but

Reason is correct statement.

## Answer: B

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**71.** Assertion :- (A) total number of octahedral voids present in unit cell of cubic close of each packing including the one that is present at the body centre . Is four .

Reason :- ( R) Besides the body centre there is one octahedral void present at the centre of each of the six faces of the unit cell and each of which is shared between two adjeccent units cells.

A Assertion and reason both are correct statements and Reason is correct explantion for Assertion. B. Asserton and Reason both are correct statement but Reason is not correct explanation for assertion. C. Assertion is correct statement but reason is worng statement. D. Assertion is Wrong statement but Reason is correct statement.

## Answer: C



**72.** Assertion :- (A) the paking efficiency is maximum for the fcc struture .

Reason :- (R) the coordination number is 2 in

fcc structures.

A. Assertion and reason both are correct statements and Reason is correct

explantion for Assertion .

B. Asserton and Reason both are correct statement but Reason is not correct explanation for assertion. C. Assertion is correct statement but reason is worng statement. D. Assertion is Wrong statement but Reason is correct statement.

Answer: B

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**73.** Assertion :-(A) semiconductors are solids with conductivites in the intermediate range from  $10^{-6} - 10^4 ohm^{-1}m^{-1}$ Reason :-(R ) internmediate conductivity in semiconductor Is due to partially filled valence band .

A. Assertion and reason both are correct statements and Reason is correct explantion for Assertion .

B. Asserton and Reason both are correct statement but Reason is not correct explanation for assertion. C. Assertion is correct statement but reason is worng statement. D. Assertion is Wrong statement but Reason is correct statement.

Answer: C

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**74.** with the help of a labelled diagram show that there are four octahedral voids per unit cell in cubic close packed structure .



**75.** Show that in a cubic close packed structure, eight tetrahedral voids are present per unit cell.



76. How does the doping increase the

conductivity of semiconductor ?



77. The composition of a sample of wustite is  $Fe_{0.93}O_{1.00}$ . What percentage of iron is present in the form of Fe(III)?

