Swotters Academy

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Test / Exam Name: Chemistry - The Solid State **Standard: 12th Science** **Subject: Chemistry**

Student Name: ..... **Section:** ..... **Roll No.:** .....

Questions: 25 | **Time: 01:45 hh:mm** | **Marks: 50**

Instructions

1. Make sure to write in the point formation. You handwriting should be neat and clean
2. New section on new page
3. Honesty is the best policy.

SECTION-A

Q1. In the cubic close packing, the unit cell has _____. **1 Mark**

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 the which is shared by four adjacent unit cells. **D** 8 Tetrahedral voids within the unit cells.

Q2. Crystal system in which maximum number of Bravais lattices are possible is: **1 Mark**

A Cubic **B** Triclinic **C** Orthorhombic **D** Rhombohedral

Q3. The lattice site in a pure crystal cannot be occupied by _____. **1 Mark**

A Molecule. **B** Ion. **C** Electron. **D** Atom.

Q4. Which of the following conditions favours the existence of a substance in the solid state? **1 Mark**

A High temperature. **B** Low temperature. **C** High thermal energy. **D** Weak cohesive forces.

Q5. Schottky defect is observed in crystals when _____. **1 Mark**

A Some cations move from their lattice site to interstitial sites. **B** Equal number of cations and anions are missing from the lattice.
C Some lattice sites are occupied by electrons. **D** Some impurity is present in the lattice.

Q6. Which of the following is an amorphous solid? **1 Mark**

A Graphite (C). **B** Quartz glass (SiO_2). **C** Chrome alum. **D** Silicon carbide (SiC).

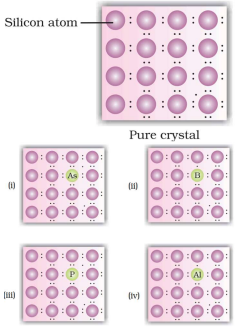
Q7. Iodine molecules are held in the crystals lattice by _____. **1 Mark**

A London forces. **B** Dipole-dipole interactions.
C Covalent bonds. **D** Coulombic forces.

Q8. Which of the following is not true about the voids formed in 3 dimensional hexagonal close packed structure? **1 Mark**

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 are not covered by the spheres of the second layer.
C Tetrahedral voids are formed when the triangular voids in the second layer lie above the triangular voids in the first layer and the triangular shapes of these voids do not overlap. **D** Octahedral voids are formed when the triangular voids in the second layer exactly overlap with similar voids in the first layer.

Q9. A perfect crystal of silicon is doped with some elements as given in the options. Which of these options show n-type semiconductors? **1 Mark**



Q10. Frenkel defect is also known as _____. **1 Mark**

A Stoichiometric defect. **B** Dislocation defect.
C Impurity defect. **D** Non-stoichometric defect.

Q11. Under which situations can an amorphous substance change to crystalline form? **1 Mark**

Q12. Why are solids incompressible? **1 Mark**

Q13. Why are liquids and gases categorised as fluids? **1 Mark**

Q14. Why is FeO(s) not formed in stoichiometric composition? **1 Mark**

Q15. **Note:** In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. **1 Mark**

1. Assertion and reason both are correct statements and reason is correct explanation for assertion.
2. Assertion and reason both are correct statements but reason is not correct explanation for assertion.
3. Assertion is correct statement but reason is wrong statement.
4. Assertion is wrong statement but reason is correct statement.

Assertion: Semiconductors are solids with conductivities in the intermediate range from 10^{-6} - 10^{4} $ohm^{-1}m^{-1}$.
Reason: Intermediate conductivity in semiconductor is due to partially filled valence band.

SECTION-B

Q16. Why does white ZnO(s) becomes yellow upon heating? **2 Marks**

Q17. Why does table salt, NaCl, some times appear yellow in colour? **3 Marks**

Q18. Inspite of long range order in the arrangement of particles why are the crystals usually not perfect? **3 Marks**

Q19. Why does the electrical conductivity of semiconductors increase with rise in temperature? **3 Marks**

Q20. Match the types of defect given in Column I with the statement given in Column II. **3 Marks**

	Column I		Column II
(i)	Impurity defect	(a)	NaCl with anionic sites called F-centres.
(ii)	Metal excess defect	(b)	FeO with Fe^{3+}.
(iii)	Metal deficiency defect	(c)	NaCl with Sr^{2+} and some cationic sites vacant.

SECTION-C

Q21. Explain why does conductivity of germanium crystals increase on doping with galium. **4 Marks**

Q22. Match the defects given in Column I with the statements in given Column II. **4 Marks**

	Column I		Column II
(i)	Simple vacancy defect	(a)	Shown by non-ionic solids and increases density of the solid.
(ii)	Simple interstitial defect	(b)	Shown by ionic solids and decreases density of the solid.
(iii)	Frenkel defect	(c)	Shown by non ionic solids and density of the solid decreases.
(iv)	Schottky defect	(d)	Shown by ionic solids and density of the solid remains the same.

Q23. Match the items given in Column I with the items given in Column II. **4 Marks**

	Column I		Column II
(i)	Mg in solid state	(a)	p-Type semiconductor.
(ii)	$MgCl_2$ in molten state	(b)	n-Type semiconductor.
(iii)	Silicon with phosphorus	(c)	Electrolytic conductors.
(iv)	Germanium with boron	(d)	Electronic conductors.

Q24. . Match the type of packing given in Column I with the items given in Column II. **4 Marks**

	Column I		Column II
(i)	Square close packing in two dimensions	(a)	Triangular voids.
(ii)	Hexagonal close packing in two dimensions	(b)	Pattern of spheres is repeated in every fourth layer.
(iii)	Hexagonal close packing in three dimensions	(c)	Coordination number 4.
(iv)	Cubic close packing in three dimensions	(d)	Pattern of sphere is repeated in alternate layers.

Q25. With the help of a labelled diagram show that there are four octahedral voids per unit cell in a cubic close packed structure. **5 Marks**