CHEMISTRY

BOOKS - JEEVITH PUBLICATIONS CHEMISTRY (KANNADA ENGLISH)

THE SOLID STATE

Questions

1. Give two difference between crystalline and amorphous solids.

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2. What are non-polar molecular solids? Give examples.

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3. What are polar molecules solids? Give examples.

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4. What are hydrogen-bonded solids? Give examples.

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5. What are covalent solids or network solids? Give examples.

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6. Define the terms (a) Crystal lattice (space lattice), (b) Unit cell.

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7. Mention seven basic crystal systems.

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8. Mention the most symmetrical and most unsymmetrical crystal system

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9. Calculate number of particles (atoms) present in simple cube unit cell.

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10. Calculate number of particles (atoms) present in body centred cube unit cell.

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11. Calculate number of particles in face centred cube unit cell (FCC).

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12. What is co-ordination number of a particle in the crystal? What is the co-ordination number in FCC structure?

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13. What type of close packing is observed when (a) ABAB pattern of arrangement of layers (b). ABC ABC pattern of arrangement of layers?

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14. What is the co-ordination of a particles in (a) hcp (b) ccp (c) bcc arrangement? Give examples for these arrangements.

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15. Wha is tetrahedral void? How many tetrahedral voids are possible per atom in the crystal?

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16. What is octahedral void? How many octahedral voids are possible per atom in the crystal?

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17. Point out the difference between tetrahedral voids and octahedral voids.

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18. What is packing efficiency?

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19. Calculate packing efficiency in simple cubic unit cell.

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20. Calculate packing efficiency in BCC lattice.

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21. Calculate packing efficiency in a CCP or HCP or FCC crystal lattice.

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22. What is imperfection in solids?

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23. What is Schottkyy defect? What is the effect on the density of solids?

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24. What is Frenkel defect? What is its effect on the density of the solid?

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25. Name the ionic solid which shows both Schottky defect and Frenkel defect.

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26. Give three difference between Schottky defect and Frenkel defect.

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27. Give example for Schottky defect and Frenkel defect ionic solids?

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28. What is metal excess defect? Give examples.

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29. Mention one consequences of metal excess defect.

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30. What is metal deficiency defect? Give example.

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31. What are F-centres? What colour is imparted to NaCl, KCl and LiCl crystals on exposure to sun light.

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32. Based on band theory explain the conductivity of solids.

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33. What are 'n' type semiconductors?

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34. What are 'p' type semiconductors?

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35. Give three defferences between n-type and p-type semiconductors.

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36. What type of semiconductor is formed when 13th group element is doped with silicon?

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37. What is paramagnetism? Give example.

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38. What is diamagnetism? Give examples.

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39. What is ferromagnetism? Give examples.

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40. What is antiferromagnetism? Give example.

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41. What is ferrimagnetism? Give example.

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Problem Section

1. Silver crystallizes in CCP lattice. The edge length of its unit cell is 408.6 pm. Calculate density of silver (atomic mass of silver is 107.9)

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2. An element having atomic mass 63.1 g/mol has face centered cubic unit cell with edge length 3.608×10^{-8} cm. Calculate the density of unit cell [Given $N_A = 6.022 \times 10^{23}$ atoms/mol].

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3. An element having atomic mass 107.9 g mol^{-1} has FCC unit cell. The edge length of

the unit cell is 486 pm. Calculate the density of the unit cell.

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4. An element occurs in BCC structure with cell edte of 288 pm. Find the density of the element it its atomic mass is 51.7?

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5. A compound formed by the element A and B crystallizes in the cubic structure, where A is at the corners of the cube and B is at body centre. What is the formula of the compound? If edge length is 5Å, calculate the density of the solid. (Atomic weights of A and B are 60 and 90 respectively).

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6. An element crystallizes in fcc lattice. If the edge length of the unit cell is 408.6 pm and the density is $10.5gcm^{-3}$. Calculate the atomic mass of the element.

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7. An element occurs in BCC structure with cell edge of 288 pm. It is $7.2gcm^{-3}$. Calculate the atomic mass of the element.

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8. The density of chromium metal is $7.2 g cm^{-3}$. If the unit cell is cubic with edge length of 289 pm. Calculate the number of atoms per unit cell. (Atomic mass = 51.79)

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9. The density of an cubic unit cell is $10.5 g cm^{-3}$. If the edge length of the unit cell is 409 pm. Find the structure of the crystal lattice (Atomic mass = 108).

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10. Niobiumcrystallizs in body centered strucure. If density is 8.55 g cm^{-3}. Calculate the edge lengthof the unit cell (Atomic mass = 93 u).

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11. Aluminium crystallizes in FCC structure. Atomic radius of the metalics 125 pm.

Calculate the edge length of the unit cell.

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12. Sodium metal crystallizes in body centred cubic lattice with the cell edge a= 428 pm. What is the radius of sodium atom.

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13. An element with edge length 7Å crystallizes in SC. Calculate radius of the

sphere.

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14. A compound A_xB_y crystallizes in a FCC lattice in which A occupies each corner of a cube and B occupies the centre of each face of the cube. What is the formula of the compound?

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15. How many tetrahedral voids and octahedral voids are possible if the number of close packed spheres in two layers is N.

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16. A compound is formed by two elements x and y. Atoms of the element y (as anions) make ccp and those of the element x (as cations) occupy all the octahedral voids what is the formula of the compound?

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