

Rajan Sir's



**MERIT-HOME**<sup>TM</sup>  
**(Learning Centre)**

**IIT-JEE/NEET/MHTCET/FOUNDATION**

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■ Chinchwad

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**Subject: Chemistry MHT-CET - QUESTION PAPER**

**Total Marks : 50**

**Class : XII**

**Topic: 1. Solid State**

**Time : 1 Hr.**

- 1) Silicon is  
a) semiconductor    b) insulator  
c) conductor        d) none of these
- 2) A metallic element has a cubic lattice. Each edge of the unit cell is 2 Å. The density of the metal is  $2.5 \text{ g cm}^{-3}$ . The unit cells in 200 g of metal are  
a)  $1 \times 10^{24}$             b)  $1 \times 10^{20}$   
c)  $1 \times 10^{22}$             d)  $1 \times 10^{25}$
- 3) A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is  $2.72 \text{ g cm}^{-3}$ . The molar mass of the metal is (N, Avogadro's constant =  $6.02 \times 10^{23} \text{ mol}^{-1}$ )  
a)  $40 \text{ g mol}^{-1}$             b)  $30 \text{ g mol}^{-1}$   
c)  $27 \text{ g mol}^{-1}$             d)  $20 \text{ g mol}^{-1}$
- 4) Select a ferromagnetic material from the followings.  
a) Dioxygen  
b) Chromium (IV) oxide  
c) Benzene  
d) Dihydrogen monoxide
- 5) In face centred cubic unit cell, what is the volume occupied?  
a)  $\frac{4}{3} \pi r^3$                 b)  $\frac{8}{3} \pi r^3$   
c)  $\frac{16}{3} \pi r^3$                 d) none of these
- 6) Which among the following solids is a nonpolar solid?  
a) Hydrogen chloride  
b) Sulphur dioxide  
c) Water                d) Carbon dioxide
- 7) In which among the following solids, Schottky defect is NOT observed?  
a) ZnS                    b) NaCl  
c) KCl                    d) CsCl
- 8) Which among the following solids shows Frenkel defect?  
a) NaCl                    b) CsCl  
c) AgCl                    d) KCl
- 9) Which among the following pairs of compounds is NOT isomorphous ?  
a)  $\text{NaNO}_3$  and  $\text{CaCO}_3$   
b) NaF and MgO  
c)  $\text{K}_2\text{SO}_4$  and  $\text{K}_2\text{SeO}_4$   
d) NaCl and KCl
- 10) The percentage of unoccupied volume in simple cubic cell is  
a) 52.40%                b) 32.00%  
c) 68.04%                d) 47.60%
- 11) Which among the following is ferromagnetic in nature?  
a) Oxygen                b) Benzene  
c) Water                    d) Iron
- 12) Which among the following is NOT an amorphous solid?  
a) Tar                      b) Camphor  
c) Butter                    d) Rubber
- 13) Which of the following is ferromagnetic in nature?  
a) Gadolinium            b) Oxygen  
c) Water                    d) Benzene
- 14) Which among the following elements when added to silicon forms P - type semiconductor?

<p>a) Sb                      b) Bi</p> <p>c) As                      d) B</p> <p>15) Which among the following crystal structures the edge length of unit cell is equal to twice the radius of one atom?</p> <p>a) End — centred orthorhombic</p> <p>b) Simple cubic</p> <p>c) Body centred cubic</p> <p>d) Face centred cubic</p> <p>16) If 'a' is edge length of a simple cubic unit cell, then atomic radius is given as</p> <p>a) 0.1 a                      b) 0.5 a</p> <p>c) a                      d) 1.5 a</p> <p>17) Copper crystallizes as face centred cubic lattice, with edge length of unit cell 361 pm. Calculate the radius of copper atom.</p> <p>a) 108.6 pm                      b) 127.6 pm</p> <p>c) 157.6 pm                      d) 181.6 pm</p> <p>18) An element crystallises in bcc structure. The number of unit cells of an element in 4 g of it is (Given- At mass = 40)</p> <p>a) <math>2 \times 0.1 N</math>                      b) <math>0.2 \times N</math></p> <p>c) <math>0.1 \times N/2</math>                      d) <math>0.1 N</math></p> <p>19) Aluminium crystallizes in face centred cubic structure, having atomic radius 125 pm. The edge length of the unit cell of aluminium is</p> <p>a) 250.0 pm                      b) 353.5 pm</p> <p>c) 465.0 pm                      d) 253.5 pm</p> <p>20) Which among the following is NOT paramagnetic in nature?</p> <p>a) Benzene                      b) <math>Fe^{3+}</math></p> <p>c) <math>Cu^{2+}</math>                      d) Oxygen</p> <p>21) The mass fcc type unit cell of copper is <math>419 \times 10^{-24}</math> g What is the mass of one atom of copper?</p> <p>a) <math>1.047 \times 10^{-21}</math>                      b) <math>2.09 \times 10^{21}</math></p> <p>c) <math>1.048 \times 10^{-22}</math>                      d) <math>4.19 \times 10^{-24}</math> g atom<sup>-1</sup></p> <p>22) In the formation of a p-type semiconductor, impurity atoms are added to have a number of valence electrons</p> <p>a) 3    b) 5    c) 1    d) 2</p> <p>23) In the formation of an n-type semiconductor, impurity atoms are added to have a num-</p>	<p>ber of valence electrons</p> <p>a) 3                      b) 5</p> <p>c) 1                      d) 2</p> <p>24) What is known as brown coal?</p> <p>a) peat                      b) lignite</p> <p>c) bituminous                      d) anthracite</p> <p>25) NaCl shows</p> <p>a) Frankel defect    b) Schottky defect</p> <p>(c) Interstitial defects    (d) Line defect</p> <p>26) An example of a substitutal impurity defect is</p> <p>a) KCl                      b) ZnS</p> <p>c) Brass                      d) CgC</p> <p>27) Where is the National Institute of Rural Development located?</p> <p>a) Shimla                      b) Hyderabad</p> <p>c) Patna                      d) New Delhi</p> <p>28) The size of tetrahedral voids formed by spheres as compared to octahedral voids formed is</p> <p>a) Equal                      b) Smaller</p> <p>c) Greater                      d) Indefinite</p> <p>29) In the BCC lattice structure, the radius of the sphere is 75 pm. The edge length of the unit cell is</p> <p>a) 32.475 Pm                      b) 212.1 Pm</p> <p>c) 37.5 Pm                      d) 173.2 Pm</p> <p>30) Due to the Frenkel defect, the density of the ionic solid</p> <p>a) Increases                      b) Decreases</p> <p>c) Remains constant</p> <p>d) Fluctuates</p> <p>31) When few cations moved from their positions into the interstitial sites in a crystalline solid, it is</p> <p>a) Interstitial defect</p> <p>b) Frenkel defect</p> <p>c) Schottky defect</p> <p>d) Line defects</p> <p>32) The order of packing efficiency in different types of unit cells is</p> <p>a) FCC &gt; BCC &lt; Simple cubic</p> <p>b) FCC &gt; BCC &gt; Simple cubic</p> <p>c) FCC &lt; BCC &gt; Simple cubic</p> <p>d) BCC &lt; FCC &lt; Simple cubic</p> <p>33) In a closest-packed lattice, the number of tetrahedral voids formed will be</p> <p>a) Equal to the number of spheres in the lattice.</p> <p>b) Half of that of a number of spheres.</p>
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<p>c) Double that of a number of spheres. d) One-fourth of that of a number of spheres.</p> <p>34) If 'R' is the radius of the spheres in the CCP arrangement and 'Y' is the radius of the octahedral voids, then a) <math>r = 0.414 R</math>      b) <math>r = 0.224 R</math> c) <math>R = 0.414 r</math>      d) <math>R = 0.224 r</math></p> <p>35) In crystal structure of sodium chloride, the arrangement of <math>\text{Cl}^-</math> ions is a) fcc      b) bcc c) Both fcc and bcc d) None of these</p> <p>36) If the coordination number of an element in its crystal lattice is 8, then packing is : a) fcc      b) hcp c) bcc      d) none of the above</p> <p>37) The total number of identical spheres required in cubic close packing arrangement of a unit cell is a) 6      b) 8 c) 12      d) 14</p> <p>38) Which of the following types of semiconductor are used as transistors ? a) n-p-n type      b) p-n-p type c) p-n type      d) Both(a) and (b)</p> <p>39) To get a n-type semiconductor, the impurity to be added to silicon should have which of the following number of valence electrons ? a) 1    b) 2      c) 3      d) 5</p> <p>40) A semiconductor of Si can be made p-type by adding a) trivalent impurity b) tetravalent impurity c) pentavalent impurity d) divalent impurity</p> <p>41) <math>\text{Fe}_3\text{O}_4</math> is ferromagnetic at room temperature but at 850 K, it becomes a) diamagnetic      b) ferrimagnetic c) paramagnetic      d) antiferromagnetic</p> <p>42) Which of the following metal oxides is antiferromagnetic in nature ? a) <math>\text{MnO}_2</math>      b) <math>\text{TiO}_2</math> c) <math>\text{NO}_2</math>      d) <math>\text{CrO}_2</math></p> <p>43) Which of the following is not an antiferromagnetic compound ?</p>	<p>a) <math>\text{MnO}</math>      b) <math>\text{MnO}_2</math> c) <math>\text{Mn}_2\text{O}_3</math>      d) <math>\text{CrO}_2</math></p> <p>44) How many <math>\text{Cs}^+</math> ions occupy the second nearest neighbour locations of a <math>\text{Cs}^+</math> ion in the structure <math>\text{CsCl}</math> (8 : 8 coordination)? a) 16      b) 8 c) 6      d) 24</p> <p>45) X-ray diffraction studies shows that Cu crystallises in face centred cubic unit cell with cell edge of <math>3.6088 \times 10^{-8} \text{ cm}</math>. An another experiment shows that Cu is determined to have a density of <math>8.92 \text{ g/cm}^3</math>. Find the atomic mass of copper. a) 61.3 u      b) 62.3 u c) 63.1 u      d) 64.1 u</p> <p>46) <math>\text{CsBr}</math> crystallises in a body centred cubic lattice. The unit cell length is 436.6 pm. a) Given that, the atomic mass of Cs = 133 u and that of Br = 80 u and Avogadro number being <math>6.02 \times 10^{23} \text{ mol}^{-1}</math>, the density of <math>\text{CsBr}</math> is a) <math>42.5 \text{ g/cm}^3</math>      b) <math>0.425 \text{ g/cm}^3</math> c) <math>8.25 \text{ g/cm}^3</math>      d) <math>4.25 \text{ g/cm}^3</math></p> <p>47) A metallic element has a cubic lattice. Each edge of the unit cell is <math>2\sqrt{2} \text{ \AA}</math>. The density of the metal is <math>2.5 \text{ g cm}^{-3}</math>. The unit cells in 200 g of metal are a) <math>1 \times 10^{24}</math>      b) <math>1 \times 10^{20}</math> c) <math>1 \times 10^{22}</math>      d) <math>1 \times 10^{25}</math></p> <p>48) Iron oxide crystallises in a hexagonal close-packed array of oxide ions with two out of every three octahedral holes occupied by iron ions. What would be the formula of the iron oxide? a) <math>\text{FeO}</math>      b) <math>\text{Fe}_2\text{O}_3</math> c) <math>\text{Fe}_3\text{O}_4</math>      d) All are possible</p> <p>49) Which among the following solids crystallises as a face centred cube ? a) Iron      b) Rubidium c) Uranium      d) Platinum</p> <p>50) The number of carbon atoms per unit cell of diamond unit cell is a) 4      b) 8 c) 6      d) 1</p>
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