TWO MARKS

1. What are Primary bonds?
2. Explain tilt boundary
3. What is eutectoid system?
4. What do you mean by Phase diagram?
5. Define homogeneous Nucleation
6. What is alpha iron?
7. Define band gap, Valence band and conduction band
8. Define density of states.
9. What is Fermi energy?
10. Name two uses of soft magnetic material

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FIVE MARKS

11. a) What are properties of Ionic bonds? Reg. No Q10/14G/11-12 ~ 2 ~

(or)

b) What is Frank-Read source?

12. a) With a neat diagram explain Lever Phase rule

(or)

b) Explain Gibbs Phase rule.

13. a) Calculate the critical free energy of nucleation of ice from water at 0P 0 PC and -5P 0 PC . Where the enthalpy of fusion of ice is 6.02 KJ molP -1 P and energy of ice-water interface , 0.076 J mP -1 P, can be taken to be independent of temperature.

(or)

b) A new forms in the shape of disc of radius r and semithickness c. If the strain energy per unit volume is A(c/r), show that the free energy of the nucleus of a given volume is a minimum,when c=√γ r/A, where A is the interfacial energy ; Δf=4/3πrP 2 PcΔg + 4/3πrP 2 PcA(c/r) + 2πrP 2 Pγ

14. a) Two parallel plates A and B are separated by a distance 3 mm and the potential difference A and B is 200V. Calculate the time taken by the electron to travel from plate A to plate B.

(or)

b) Give a note on factors affecting electrical resistance of materials.

15. a) Write a note on magnetostriction

(or)

b) Give an account on Ferro electricity

11. a) With an example explain ionic bond formation.

(or)

b) What are the characteristics of covalent bond? Reg. No Q10/14R/04-13 ~ 2 ~

12. a) Write a note on ‘eutectic’ system. (or) b) Write a note on Hume-Rothery’s empirical rules. 13. a) Draw and discuss the phase diagram of Iron – carbon system.

(or)

b) Briefly discuss about nucleation and growth.

14. a) Discuss about Drude-Lorentz’s free electron theory.

(or)

b) Briefly discuss about sommerfield free electron theory.

15. a) What are piezoelectric crystals? And briefly state their applications.

(or)

b) Classify semiconductors on the basis of Fermi energy and Fermi levels.

11. Explain briefly on structure of materials

(Or)

B) Write a short note on covalent bond

12. Calculate the number of components and number of degrees of freedom in a mixture of HR 2R (g), OR 2R (g) and HR 2RO (g). (Or) Reg. No Q4/14C/10-13 ~ 2 ~ You are given that the element Brass has a peristaltic section at a temperature of 903˚C, with 36.8% Zn(β- phase) in the middle and 32.5% Zn at α – phase and 37.5 % Zn at its liquid state. Find out the percentages of liquid phase and α – phase present at the peristaltic point? 13. Explain rate of phase transformation with necessary diagram

(Or) Explain briefly about nucleation and how it is developed into a big one 14. Write a short note on electron energies in a metal (Or) Write a short note on Zone theory of solids 15. Explain the phenomena of ferro electricity with hysteresis loop (Or) Write a note on use of dielectrics11. a) With a suitable example write about covalent bond. (or) b) Write a note on Hydrogen bonds. Reg. No Q10/6D/03-14 ~ 2 ~

12. a) Explain peritectic and peritectoide systems.

(or)

b) Briefly discuss about Hume-Rothery's rules.

13. a) What is a phase diagram? What are their applications?

(or)

b) Briefly discuss about the phase diagram of Iron-carbon system.

14. a) Write a note on Drude-Lorentz free electron theory.

(or) b) What are the properties of metals?

15. a) Write a note on Fermi Energy and Fermi levels of a semiconductor

(or)

b) Write shortly about the magnetic properties of materials.

11. a) What are ceramics? Discuss their properties.

(or)

b) Write a note on crystal imperfections.

12. a) State and explain Rothery's rules.

(or)

b) Differentiate peritectic and peritectoid systems. Reg. No Q10/14E/04-15 ~ 2 ~

13. a) List the application of phase transformations.

(or)

b) Explain the allotropes of iron.

14. a) Brief the zone theory in solids.

(or)

b) Discuss the factors affecting the electrical resistance of materials.

TEN MARKS

16. What are imperfections? Classify, and discuss crystalline imperfections.

17. Discuss the importance and different rules pertaining to the construction of phase diagram.

18. In detail discuss about the formation of Austenite with the help of T-T-T diagram of steel.

19. Discuss about sommerfeld's model for free electron theory.

20. What are dielectrics? Discuss the theory of ferro electricity.

16. Discuss in detail the types of bonding in solids with suitable examples.

17. Explain in detail the Eutectic phase diagram & discuss its advantages.

18. a) Discuss in detail the phase diagram of iron-carbon system. (5) b) Write a note on the time temperature transformation (TTT) diagram. (5)

19. In detail discuss the free electron theory of metals & how does it explain the energy gap? 20. What are semiconductors? Discuss the classification of semiconductors based on their Fermi energy and levels

16. Explain the various types of bonding in crystals with examples. Q10/14G/11-12 ~ 3 ~

17. Explain Hume Rothery rules regarding the formation of Substitutional solid solution.

18. Describe the working of iron-carbon diagrams and list the advantages and limitations of these diagrams when applied to heat treatment.

19. Explain the zone theory of solids.

20. How semiconductors are classified on the basis of Fermi energy and Fermi levels.

6. In detail discuss about different types of crystal imperfections.

17. Discuss about various rules pertaining to the construction of phase diagrams.

18. Analyse the formation of Austenite with the help of T-T-T diagram of steel.

19. Deduce an expression for finding Fermi energy in metals.

20. Discuss the theory and applications of Ferro electricity

16. Explain the zone theory of solids

17. How semiconductors are classified on the basis of Fermi energy and Fermi levels.

18. Write a note on the formation of austenite

19. Explain in detail the electron theory of metals

20. Explain briefly the differences intrinsic and extrinsic semiconductor *