PH3259 APPLIED MATERIAL SCIENCE

IMPORTANT QUESTIONS AND QUESTION BANK

UNIT-I CTYSTALLOGRAPHY

2-Marks

1. Define crystalline?
2. What is the basic principle of crystal?
3. Define unit cell?
4. Define SC and BCC?
5. Define FCC?
6. Write a short note on Bravais lattices?
7. Define miller indices?
8. What are water flats?
9. Differentiate crystalline-non crystalline materials?
10. Draw the diagram of unit cell?

13-Marks

1. Explain the details about crystal system? And explain the symmetry of crystals?
2. Write a neat explain of unit cell and it their function of crystalline materials?
3. Write a note at Bravais lattices and their briefly explain their symmetry of Bravais lattices?
4. Write a surface and packing fraction of SC and BCC (body centred)?
5. Explain the types of crystal system and there is unit cells and lattices?
6. Explain the service and packing fraction of FCC (face centre cubic)?
7. Explain the classification of crystal system?
8. Explain their shape of crystal system and their it details to write them?
9. Write a difference between BCC and FCC?
10. Explain the various crystal system and draw a neat diagram?
11. Explain any one experimental method of growing signal crystal?
12. Derive a packing factor of HCP?
13. Describe the steps to determine the miller indices and also mention its importance?
14. Write a notes imperfection of crystals. Describe a suitable method to grow single crystal of semiconducting material?
15. Write a short on (i) crystal system (ii) packing factor (iii) water surface orientation (iv) diamond cubic and NaCL structure?

UNIT-II PHASE DIAGRAMS

2-marks

1. Define solid solution?
2. Define intermediate phase diagram?
3. Define Gibbs phase rule?
4. Draw unary phase diagram?
5. Draw binary phase diagram?
6. Define lever rule?
7. Define binary electric diagram?
8. Define slow cooling?
9. Write a composition of eutectic?
10. Mechanical properties of Cu-Ni system?

13 marks

1. Explain and derive the graphs are Binary-Eutectic systems?
2. Derive an explain the Cu-Ni systems in Binary system in non-equilibrium cooling and equilibrium cooling?
3. Explain the details of Gibbs phase rule and it their applications?
4. Explain the phase diagram of lever rule and its details of essentially isotherm?
5. Explain the details of eutectic system in (Pb-Sn) and its their examples?
6. Explain the details in hypoeutectic system and hypereutectic system?
7. Discuss the details about types of phase diagram?
8. Explain the rules to find the actual composition and relative amounts of the phase diagram?
9. Details of phase equilibria- solubility limit and write the components and phase?
10. (i) explain the unary phase diagram
(ii) explain binary phase diagram and isomorphous systems
11. Derive the derivation of lever rule and write the classification of phase diagram?
12. Discuss the details about intermediate phases and intermetallic and electron component?
13. Write a short note in (i) hyper eutectic (ii) hypo eutectic

14. Explain the details about microstructural development during the slow cooling?

UNIT-III ELECTRICAL AND MAGNETIC PROPERTICS OF MATERIALS

2-Marks

1. What is meant by a free electron?
2. Define drift velocity of electron?
3. Define mobility of electron?
4. Define electrical conductivity?
5. Define thermal conductivity?
6. Success of classical free electron theory?
7. Define magnetic materials?
8. Effect of Dia and para?
9. Define GMR device?
10. What is ferromagnetism?

13-Marks

1. What are the drawbacks are classical free electron theory? (or0 state the demerits of classical free electron theory?
2. Distinguish between electrical conductivity and thermal conductivity?
3. Explain the quantum free electron theory?
4. Explain the density of energy state and its their classification?
5. Explain the details about the effects of Dia, para and ferromagnetic materials?
6. Write a detail on GMR device and the explain about the construction and working methods?
7. Explain the details with quantum interference devices?
8. On the basic of spin how the materials are classified Dia, para and ferromagnetic?
9. Define ferromagnetism and explain the properties of ferromagnetic materials?
10. What is domain theory of ferromagnetism mention the energies involved in origin domains in ferromagnetic materials?
11. Mention few soft magnetic materials and their application and soft magnetic materials?
12. State and explain about magnetic materials and its their properties of hard magnetic materials?
13. Mention the properties of ferromagnetic materials?

14. Differentiate the points of hard and soft magnetic materials?
15. Explain the notes of energy bands in solids?

UNIT-IV SEMICONDUCTORS AND TRANSPORT MATERIALS

2-marks

1. What are the elemental semiconductors?
2. Give important elemental semiconductors?
3. What are the properties of semiconductors?
4. Mention any two advantages of semiconducting materials?
5. What are the compound semiconductors?
6. What are semiconductors?
7. What id N-type semiconductors?
8. What is P-type semiconductors?
9. Define hall effect and hall voltage?
10. Mention the application of hall effects?

13-Marks

1. Describe the conductivity of conductors, semiconductors, and insulator with the help of energy bands diagram?
2. Describe the details in intrinsic semiconductors and extrinsic semiconductors?
3. Discuss the formation and operation of N type and P type semiconductors?
4. Give some important compound of semiconductors? And differentiate between the elemental semiconductors and compound semiconductors?
5. What is meant by intrinsic and extrinsic semiconductors?
6. Compare p-type and n-type semiconductors?
7. Define impurity range exhaustion range and intrinsic range in n-type semiconductors?
8. Explain the variation of carrier concentration with temperature?
9. Explain in details about transport semiconductors?
10. Write a short note on; (i) n-type semiconductor (ii) p-type semiconductor
11. Explain the details of hall effects and it their application?
12. Explain in details about ohmic contacts?
13. Write a detail of Schottky diode? And explain the working principle?
14. Draw and explain the energy band diagram?

UNIT-V OPTICAL PROPERTIES OF MATERIALS

2-Marks

1. Mention any three advantages of led electronic supply?
2. Mention any four advantages of fibre optic?
3. Mention some any fibre optic source?
4. What is meant by injection luminescence? Give its examples?
5. Define solar cell?
6. State the application of optical fibre?
7. Define optical absorption emission?
8. Define the basic principle of optic materials?
9. Define light emitting diode?
10. Define Plasmonics?

13-Marks

1. Give their application of optical process in semiconductors?
2. Write the classification of optical materials?
3. Explain the optical process in semiconductors?
4. Write a process and construction, working principle of optoelectronic devices? And give their applications?
5. Differentiate the liner optical materials and non-linear optical materials?
6. Write a neat explain with the modulator and switching devices and its their examples?
7. What is meant by LED give it's the explain their principles?
8. Explain the optical process in organic semiconductors device and its examples are given?
9. Explain about the light detectors and solar cells give the application and their limitations?
10. Write a short note on; (i) light emitting diode (ii) laser diode
11. Write an explanation at optical process in quantum walls?
12. Explain about the details of optical absorption and emission?
13. Explain the details of light detectors?
14. Write the explanation of plasmonics in details and give its their applications?