

**Material Science**  
**III Year - V Semester - B.Sc Physics**

**Part A**

1. Define unit cell.
2. What is coordination number?
3. What is Atomic radius?
4. Define Packing factor
5. What are Miller indices?
6. What you mean by Point Defects?
7. Write about line surface, volume defects
8. What are schottky and frankel defects?
9. Explain point defects
10. Draw (111) crystal plane
11. Define Polarization
12. What are types of polarization?
13. Define Internal or Local field
14. What is Dielectric loss?
15. Write about Application for Ferroelectrics
16. What are Piezoelectric materials?
17. Give an account on hysteresis
18. Distinguish between Soft and Hard magnetic materials
19. What is Ferroelectricity?
20. What is Diamagnetism?
21. What is Paramagnetism?
22. Give a brief account on Ferrites
23. Write notes on a.) Flappy disc b.) CD ROM
24. Write few differences between Soft and Hard magnetic materials
25. What is Hall effect?
26. State Meissner effect
27. Explain the high temperature superconductors
28. What is Type1 and Type2 superconductors?
29. Define Transition temperature
30. Write some applications of Hall effect
31. What are 123 superconductors?
32. What are liquid crystals?
33. Write some application of LCD
34. What are Metallic glasses?
35. Write the properties and application for Metallic glasses
36. What are Carbon nanotubes?

## Part B

1. Explain the structure of HCP and hence deduce the packing factor with  $c/a$  ratio
2. Discuss the point defects and surface defects
3. Explain with neat sketch various crystal systems and corresponding Bravais lattices
4. Derive the following FCC and HCP structures
  - a.) Atomic radius
  - b.) Atomic packing factor
5. Deduce the Clausius–Mossotti relation with help of local field
6. Describe Piezoelectric, Ferroelectric and Pyroelectric materials with applications
7. Describe the variation of dielectric constant with respect to frequency in dielectric materials
8. Explain domain theory of hysteresis with neat sketch
9. Discuss the Elementary ideas of classification of magnetic materials
10. Write notes on a.) Magneto optical recording b.) CD ROM
11. Write notes on structure and properties of Ferrites
12. Derive the number of electrons in conduction band of an intrinsic semiconductor and get the expression of intrinsic carrier concentration
13. Explain with neat sketch Type 1 and Type 2 superconductors
15. Discuss about 123 superconductors
16. What are metallic glasses? Explain their synthesis and applications
17. What are carbon nanotubes? Explain their properties and application