



Date: 21-04-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer **ALL** Questions

(10x2=20 marks)

1. Write the differences between crystalline and amorphous solids.
2. Define the term 'unit cell'.
3. What are solid state reactions? Give their types.
4. List out the essential differences between TGA and DTA.
5. What do you mean by point defects?
6. What are pyroelectric materials? Give an example.
7. Define the term magnetic susceptibility.
8. What is Curie temperature?
9. What is Meissner effect?
10. What are ionic conductors? Give an example.

PART – B

Answer any **EIGHT** Questions

(8x5=40 marks)

11. Calculate the edge length of the unit cell of a substance that crystallizes in the fcc pattern.
The density of the substance is 1.980g/cm^3 and its molecular weight is 74.5.
12. Explain the structure of NaCl in the light of X-ray diffraction method.
13. Write a note on radius ratio rules.
14. Explain the basic principle and procedure involved in Bridgman method.
15. Explain how is thermo gravimetric analysis useful in crystallographic studies?
16. Calculate the mole fractions of Schottky and Frenkel defects in a NaCl crystal at 1000K.
Given the energies of formation of these defects are 2eV and 3 eV respectively
($1\text{eV} = 1.602 \times 10^{-19}\text{J}$; $K = 1.38 \times 10^{-23}\text{JK}^{-1}$).
17. a) Explain Why does conductance of a metal decrease on increasing its temperature?
b) What is meant by extrinsic semi conduction?
18. Write a note on solar energy conversion.
19. State and explain Curie-Weiss law.
20. Explain the following terms:
(i) Para magnetism (ii) Diamagnetism and (iii) Ferromagnetism.
21. What are high energy batteries? Give their advantages over other batteries.
22. Write the various applications of superconducting materials.

PART-C

Answer any **FOUR** Questions

(4x10=40 marks)

23. a) Sketch the following types of crystal lattices. (6)

(i) a simple cubic (ii) a fcc and (iii) a bcc.

b) Draw the structure of Zinc blende. (4)

24. a) Write a note on spinels. (5)

b) Write a note on organic semiconductors. (5)

25. Explain the principle, working function and applications of scanning electron microscopy.

26. Discuss the Schottky and Frenkel defects in crystal systems.

27. What are magnetic properties? Explain their classification with suitable examples.

28. What are liquid crystals? Explain their types and applications.

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