B.Sc. DEGREE EXAMINATION,APRIL 2019
III Year VI Semester
Solid State Physics and Semi-Conductor Devices

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. Define unit cell.
2. What is meant by the atomic radius in a crystal?
3. What are X-rays?
4. Define bond length and bond angle.
5. What is Curie-Weiss law?
6. Define Curie temperature.
7. What is meant by electric polarisation?
8. Define dielectric constant.
9. Draw an equivalent circuit for UJT.
10. Mention any two applications of SCR.
11. Sketch the planes (111) and (110) in a simple cubic cell.
12. Define Coordination number.

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Discuss the seven systems of crystals with suitable diagrams.
14. Deduce Bragg's law for the diffraction of X-rays by a crystal.
15. Distinguish between dia, para and ferromagnetic materials.
16. Obtain Clausius – Mosotti relation between polarizability and dielectric constant of a solid.
17. Draw the drain characteristics of n-channel FET and discuss the different regions of importance in the characteristic curve.
18. Show that in a cubic crystal the spacing between consecutive parallel planes of Miller indices (h,k,l) is given by $d_{hkl} = \frac{a}{\sqrt{h^2+k^2+l^2}}$
19. Explain the operation of UJT relaxation oscillator with a neat circuit diagram.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Describe the face centred cubic and hexagonal close packed structures. Show that the atomic packing factor for fcc and hcp structures are the same.
21. With a neat diagram explain the construction and working of rotating crystal method to determine crystal structure.
22. Discuss the Langevin theory of diamagnetism. Show that the diamagnetic susceptibility is negative and independent of temperature.
23. Explain the phenomenon of electric polarization in dielectrics and discuss any two types of electric polarization in detail.
24. Explain with a neat circuit diagram the construction and working of a SCR and also discuss the V-I Characteristics of a SCR.

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