

**UG 4<sup>TH</sup> SEMESTER EXAMINATION 2021**

**KANDI RAJ COLLEGE  
UNIVERSITY OF KALYANI  
DEPARTMENT OF PHYSICS**

**SEMESTER: 4<sup>TH</sup>**

**STREAM: Programme**

**PAPER CODE: PHY-G-CC-P-04**

**Paper: Solid State Physics**

**Full marks: 10**

**Answer any five questions:**

**5X2=10**

1. Justify: lattice + bases = Crystal structure
2. How can you measure the Magnetic susceptibility of Solids in laboratory?
3. With neat diagram showing X-ray diffraction, derive an expression for Bragg's law.
4. Outline the construction and working of Bragg's Spectrometer to determine the inter planar spacing of a crystal.
5. Why does the coefficient for thermal expansion vanish at zero temperature?
6. Which electrons contribute to the free electron model: all electrons or valence electrons? Explain.
7. What is the content of the Wiedemann-Franz law and for which materials does it hold?
8. What is the Fermi energy and how large is it in typical metals?
9. How can you measure the resistivity of a semiconductor (Ge) with temperature by four-probe method (room temperature to 150 °C).