

21PHY3E1AL**M.Sc. III Semester Degree Examination, April/May - 2023****PHYSICS****Advanced Condensed Matter Physics****(CBCS)**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with Question No. **1 (Q.1) Compulsory**, each question carries **equal** marks.

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| 1. | (a) | Deduce Bragg's law in reciprocal lattice. | 7 |
| | (b) | What is reciprocal lattice ? Show that reciprocal lattice of bcc is fcc. | 7 |
| 2. | (a) | Derive Chamber's equation for the change in the distribution function of a system due to applied field. | 10 |
| | (b) | State and explain Wiedemann - Franz law. | 4 |
| 3. | (a) | What is polarization ? Deduce an expression for both ionic and electronic polarizability. | 10 |
| | (b) | Write a note on complex dielectric constant. | 4 |
| 4. | (a) | Give an account of Weiss theory of ferromagnetism. | 9 |
| | (b) | Draw a typical M-H curve and explain different stages of magnetization process for a ferromagnetic materials. | 5 |
| 5. | (a) | Obtain London equations of superconductivity. | 8 |
| | (b) | Give the qualitative ideas of BCS theory of superconductivity. | 6 |
| 6. | (a) | Explain Seebeck and Peltier effects. | 6 |
| | (b) | Obtain Clausius - Mosotti relation. | 8 |
| 7. | (a) | Describe briefly the domain theory of ferromagnetism. | 7 |
| | (b) | Explain the flux quantization in a superconducting ring. | 7 |
| 8. | Write a short note on : | | |
| | (a) | Magneto resistance. | 4 |
| | (b) | Nuclear magnetic resonance. | 5 |
| | (c) | Meissner effect. | 5 |

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