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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **Ph.D. Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 31- 01- 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOE | **Program:** Ph.D. |
| **Course Code :** PHY808 | **Course Name :** Fundamental of Physics |
| **Semester**:  | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **20** | **40** | **40** |  |  |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 10 marks. 6Q x 10M=60Marks** |
| **1** | Analyze how the Fermi level changes in n-type and p-type semiconductors under varying doping concentrations. | **10 Marks** | **L3** | **CO1** |
| **2** | Compare and contrast direct and indirect bandgap semiconductors with examples. | **10 Marks** | **L4** | **CO1** |
| **3** | Derive the Clausius-Mossotti equation and explain its significance in dielectric materials. | **10 Marks** | **L3** | **CO2** |
| **4** | Analyze the role of internal electric fields in enhancing the dielectric constant of a material. | **10 Marks** | **L4** | **CO2** |
| **5** | Apply Langevin’s theory to explain the temperature dependence of paramagnetic susceptibility. | **10 Marks** | **L3** | **CO3** |
| **6** | Analyze the differences in properties between soft and hard ferrites with suitable applications. | **10 Marks** | **L4** | **CO3** |

**Part B**

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| **Answer the Questions. Each question carries 20 marks 2Q x 20 = 40 Marks** |
| **7.** |  | Apply the concept of polarization to explain the working principle of pyroelectric sensors in thermal imaging devices. | **20 Marks** | **L3** | **CO2** |
|  |
| **8.** |  | Apply domain theory to explain the working principle of ferromagnetic materials in transformer cores. | **20 Marks** | **L3** | **CO 3** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***