**Code No. BS204HS**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY**

**(An Autonomous Institution)**

**B.E. (ECE/EEE) II-Semester (AICTE) Examination, SEPTEMBER-2023**

**Subject: APPLIED PHYSICS**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.(10X2M=20M)**

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| --- | --- | --- | --- | --- |
| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | What are the drawbacks of classical free electron theory? | 2 | 1 | 2 |
| **b** | Distinguish between intrinsic and extrinsic semiconductors. | 2 | 1 | 1 |
| **c** | Write the applications of ferroelectric materials. | 2 | 2 | 2 |
| **d** | Mention the properties of ferromagnetic materials. | 2 | 2 | 1 |
| **e** | Write the physical significance of wave function. | 2 | 3 | 2 |
| **f** | Enlist any four general properties of superconductors. | 2 | 3 | 2 |
| **g** | Write the characteristics of laser. | 2 | 4 | 1 |
| **h** | Mention the advantages of optical fiber over coaxial cables. | 2 | 4 | 3 |
| **i** | How thin films are different from bulk and materials? | 2 | 5 | 2 |
| **j** | List out the fabrication methods used to synthesize nano materials. | 2 | 5 | 1 |

**PART-B**

**Answer Any Five questions**.**(5X8M=40M)**

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| --- | --- | --- | --- | --- | --- |
| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Classify solids based on energy bands and differentiate between them with energy band diagrams. | 5 | 1 | 2 |
| **b** | What are the Limitations of Classical free electron theory. | 3 | 1 | 3 |
| **3.** | **a** | What is electronic polarizability? Obtain the expression for electronic polarizability | 5 | 2 | 2 |
| **b** | The magnetic field intensity of a material is 106 A. Calculate the magnetization and flux density if its magnetic susceptibility is 1.5x10-3. | 3 | 2 | 3 |
| **4.** | **a** | Derive Schrödinger time independent wave equation for a free particle | 5 | 3 | 3 |
| **b** | Show that super conductors exhibit perfect dia magnetism | 3 | 3 | 2 |
| **5.** | **a** | Describe the construction and working of Ruby laser with its energy level diagram. | 5 | 4 | 1 |
| **b** | Calculate the refractive index of core and cladding of an optical fibre. The NA and fractional difference between the refractive indices of core and cladding of the optical fibre are 0.22 and 0.012 respectively. | 3 | 4 | 3 |
| **6.** | **a** | What is Photo -voltaic effect? Describe the I-V characteristics of solar cell. | 5 | 5 | 2 |
| **b** | List the various types of nano materials and also write their examples. | 3 | 5 | 1 |
| **7.** | **a** | Explain the formation of PN-junction diode | 4 | 1 | 2 |
| **b** | Differentiate between hard and soft magnetic materials on the basis of domain theory | 4 | 2 | 2 |
| **8.** | **a** | What are matter waves? Derive the equation for de-Broglie wavelength of an electron of potential V. | 4 | 3 | 3 |
| **b** | Differentiate between step index and graded index fibre | 4 | 4 | 2 |
| **9.** | **a** | Explain ball milling method for synthesize of nano materials | 4 | 5 | 1 |
| **b** | Interpret the conclusions of Kronig-Penney model | 4 | 1 | 2 |

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