Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17PH3013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SOLID STATE PHYSICS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Briefly describe one and two dimensional vibrations in solids. | CO1 | 4 |
| b. | Deduce the equation of electron in an one-dimensional infinite periodic potential using the Kronig-Penney model. | CO1 | 16 |
| **(OR)** | | | | |
| 2. |  | Describe in detail the electronic wavefunction using Bloch's theorem and discuss Bloch’s function. | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | Differentiate the properties of various types of polarization in solids. | CO2 | 4 |
| b. | Derive Classius-Mosotti relation to relate the macroscopic dielectric constant with microscopic polarizabilities. | CO2 | 16 |
| **(OR)** | | | | |
| 4. | a. | Write a short note on Brillouin Zone. | CO2 | 4 |
| b. | Discuss the Weiss theory of ferromagnetism in detail and analyze the spontaneous magnetization. | CO2 | 16 |
|  |  |  |  |  |
| 5. | a. | Briefly describe Fermi surface. | CO3 | 4 |
| b. | Discuss the experimental determination of dielectric constant in detail and deduce the equation for the same. | CO3 | 16 |
| **(OR)** | | | | |
| 6. |  | Discuss in detail the quantum theory of paramagnetism in detail. | CO3 | 20 |
|  |  |  |  |  |
| 7. | a. | Describe in detail different types of luminescence with examples. | CO4 | 4 |
| b. | Describe in detail the principle, construction and working of a photoconductor. | CO4 | 16 |
| **(OR)** | | | | |
| 8. | a. | Discuss in brief the electrical and thermodynamical properties of suerpconducting materials. | CO5 | 4 |
| b. | Compare and contrast the different types of superconductors and its conductivity behavior in detail. | CO5 | 16 |
|  | | **Compulsory**: |  |  |
| 9. |  | Discuss in detail about the Bardeen–Cooper–Schrieffer theory to explain the phenomenon of electron pairs at low temperatures in certain materials. | CO6 | 20 |