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

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**End Semester Examination – Nov/Dec – 2018**

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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 Fermions and Excitons in a solid. | CO1 | 4 |
| b. | Discuss the failure of classical free electron theory. Explain nearly free electron model with energy curve diagram. | CO1 | 16 |
| (OR) | | | | |
| 2. |  | Explain the electron in an one-dimensional periodic potential using the Kronig-Penney model. | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | Compare and contrast different types of polarization in dielectrics. | CO2 | 4 |
| b. | Illustrate ionic and electronic polarization in detail with examples. | CO2 | 16 |
| (OR) | | | | |
| 4. | a. | State any four properties of ferroelectricity. | CO2 | 4 |
| b. | Derive Classius-Mosotti relation to relate the macroscopic dielectric constant with microscopic polarizabilities. | CO2 | 16 |
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| 5. | a. | Discuss the concept of ferrimagnetism. | CO3 | 4 |
| b. | Explain the temperature dependence of magnetism and Neel temperature in detail. | CO3 | 16 |
| (OR) | | | | |
| 6. | a. | Describe ferromagnetic domain surfaces in brief. | CO3 | 4 |
| b. | Explain Weiss theory of ferromagnetism in detail to find the spontaneous magnetization under critical temperature. | CO3 | 16 |
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| 7. | a. | Write a short note on photoconductors and its applications. | CO4 | 4 |
| b. | Summarize the concept of trap capture and recombination centres in a solid. Analyse its effect in color centres. | CO4 | 16 |
| (OR) | | | | |
| 8. | a. | What are crystal defects? Explain its uses in detail. | CO5 | 4 |
| b. | Analyse the excitation, emission and decay mechanism of electroluminescence and thermoluminescence. Briefly describe its properties and applications. | CO5 | 16 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Describe high Tc superconductors with examples. | CO6 | 4 |
| b. | Explain Meissner effect. Classify different types of superconductors and discuss its thermodynamic properties to adapt it for new kind of superconductors. | CO6 | 16 |