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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **15PH3014** | **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. | Write a short note on phonon momentum. | CO1 | **04** |
| b. | Briefly explain classical free electron theory. Explain nearly free electron theory in detail with its energy curve diagram | CO1 | **16** |
| **(OR)** | | | | |
| 2. |  | Describe the concept of phonons and its modes in detail. Discuss various solid state properties of phonons in solid state phenomena. | CO1 | **20** |
| 3. | a. | With suitable diagram explain grain boundary in solids. | CO1 | **04** |
|  | b. | Explain band theory of solids in detail with necessary diagram. | CO1 | **16** |
| **(OR)** | | | | |
| 4. |  | Derive the Bloch theorem based on band theory of solids. | CO1 | **20** |
| 5. | a. | What is polarisaiton in solids? Describe different types of polarisation in detail. | CO1 | **08** |
|  | b. | Find the expression relating the macroscopic dielectric constant with microscopic polarizabilities by driving the Classius-Mosotti relation. | CO1 | **12** |
| **(OR)** | | | | |
| 6. | a. | Give an account on antiferromagnetism and Neel temperature | CO1 | **08** |
|  | b. | Derive the equation for the temperature dependence of dielectric constant in a ferroelectric crystal with necessary graph. | CO1 | **12** |
| 7. | a. | Briefly describe trap capture and recombination centres in photo conductivity. | CO1 | **08** |
|  | b. | Explain Electro-luminescence in detail with an example and adequate graph | CO1 | **12** |
| **(OR)** | | | | |
| 8. |  | Explain the microscopic origin of superconductors based on BCS theory of superconductivity in detail with adequate diagram. | CO1 | **20** |
|  | | **Compulsory:** |  |  |
| 9. | a. | Describe high Tc superconductors with an example. | CO1 | **06** |
|  | b. | Explain Meissner effect in detail. How will you classify different types of superconductors? With appropriate graph explain it in detail. | CO1 | **14** |

ALL THE BEST