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 – April/May – 2017**

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| **Code :** | **14EC2002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTRON DEVICES** | **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. | Derive an equation for electron concentration(n0)under thermal equilibrium condition with neat diagram. | CO1 | 15 |
| b. | Calculate the thermal equilibrium electron concentration in silicon at T=300 K. Assume the fermi energy is 0.25ev below the conduction band and the value of Nc =2.8 X 1019cm-3 | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | With the energy band structure derive the mathematical equation for electron concentration in a compensated semiconductor. | CO1 | 14 |
| b. | Determine the n0p0 product for intrinsic semiconductor. | CO1 | 6 |
| 3. | a. | Explain the principle of Hall effect and derive the expression of Hall voltage and Hall coefficient. | CO1 | 10 |
|  | b. | With neat diagrams, explain the different methods of carrier generation and recombination. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Explain the following:                                                                             i. Drift current                       ii.         Diffusion Current | CO1 | 10 |
|  | b. | Explain the working principle of PN diode under forward and reverse biased conditions with its volt-ampere characteristics. | CO2 | 10 |
| 5. | a. | With neat diagram,derive the expression for barrier potential (Eo) under open circuited PN junction with diagram. | CO2 | 14 |
|  | b. | If the reverse saturation current in a pn junction silicon diode is 1nA, find the applied voltage for a forward current 0.5µA. | CO2` | 6 |
| (OR) | | | | |
| 6. | a. | With neat diagrams, explain the operation, input and output characteristics of NPN transistor in CB configuration. | CO2 | 15 |
|  | b. | Compare BJT and JFET. | CO2 | 5 |
| 7. | a. | Explain the construction, operation and characteristics of Enhancement MOSFET with neat diagram. | CO2 | 15 |
|  | b. | Give the VI characteristics of UJT. | CO2 | 5 |
| (OR) | | | | |
| 8. | a. | Explain the operation of JFET with necessary diagram. Also mention the applications of the same. | CO2 | 15 |
|  | b. | What are the applications of tunnel diode. | CO3 | 5 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the construction and operation of silicon controlled rectifier with necessary circuit diagram. Also list out its applications. | CO3 | 10 |
|  | b. | With neat diagram explain the construction and operation of LED. Also mention its advantages . | CO2 | 10 |

ALL THE BEST