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



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

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| **Code :** | **16PH2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SEMICONDUCTOR PHYSICS II** | **Max. Marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
|  | b. | Demonstrate the formation of junction upon the fusion of P and N materials and the significance of barrier potential. | CO1 | 10 |
| c. | Draw the forward and reverse bias characteristics of a PN junction and explain the various regions with energy band diagram. | CO1 | 10 |
| **(OR)** | | | | |
| 2. |  | Write short notes on the following diode parameters:  i) Knee voltage ii) Barrier potential  ii) diffusion iv) Space charge region. | CO1 | 20 |
|  |  |  |  |  |
| 3. | a. | Design a clipping circuit using IN4001 Diodes and draw the wave form at each levels. | CO2 | 10 |
| b. | Design a circuit to convert ac signal to dc with bridge rectification model. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | List out the electrical parameters that could be measured using Hall effect experiment. | CO1 | 5 |
| b. | Deduce the Hall coefficient and the other possible parameters through the application of transverse magnetic field applied to a current carrent conductor. | CO2 | 15 |
|  |  |  |  |  |
| 5. | a. | Construct a field effect transistor using a metal gate and explain the source drain characteristics. | CO2 | 15 |
| b. | State the significance of trans conductance and draw the characteristic. | CO3 | 5 |
| **(OR)** | | | | |
| 6. | a. | Compare the working and transfer characteristics of Enhancement MOSFET with Depletion MOSFET. | CO2 | 15 |
| b. | State the condition for quantum mechanical tunneling to happen in a semiconductor junction. | CO2 | 5 |
|  |  |  |  |  |
| 7. |  | Define SCR. Explain the rectification process and draw the back to back to transistor equivalent circuit to explain the working with the IV characteristics. | CO2 | 20 |
| **(OR)** | | | | |
| 8. | a. | State the Photovoltaic effect in a semiconductor. | CO1 | 5 |
| b. | Deduce the following solar cell parameters:  i) Open circuit voltage ii) Short circuit current  iii) Power Maximum iv) Fill factor v) Efficiency | CO2 | 15 |
|  | | **Compulsory**: |  |  |
| 9. |  | Appraise how the digital technology has improved in electrical measurements with the interface of computer controllers. | CO3 | 20 |