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



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

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **17PH3004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SEMICONDUCTOR PHYSICS** | **Max. Marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Explain the construction and working of UJT with a suitable current-voltage characteristics curve. | CO1 | 10 |
| b. | Illustrate the construction and working of N-channel enhancement MOSFET with the suitable current-voltage characteristics curve. | CO1 | 7 |
| c. | The gate current of a JFET is 0.5 nA for a reverse gate voltage of 5V. Find the input resistance between the gate and source. | CO1 | 3 |
| **(OR)** | | | | |
| 2. | a. | Discuss the basic structure, symbol and working of triode a.c. switch. | CO1 | 10 |
| b. | Explain the working of tunnel diode with energy band diagram and current-voltage characteristics curve. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | List the advantages and limitations of integrated circuits. | CO2 | 4 |
| b. | Illustrate the various processes involved in the fabrication of monolithic integrated circuits. | CO2 | 16 |
| **(OR)** | | | | |
| 4. | a. | Construct a 5 kΩ diffused resistor from the given sheet resistance of P- type diffusion is 250 Ω/ square. | CO6 | 2 |
| b. | Explain any two methods for fabricating integrated resistors. | CO2 | 6 |
| c. | Compare large scale integration (LSI) and small scale integration (SSI). | CO2 | 2 |
| d. | Discuss in detail the structures of monolithic diode and capacitor . | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Summarize the characteristics and parameters of an op-amp. | CO3 | 7 |
| b. | Explain the op-amp summing amplifier circuit and obtain an expression for the output voltage. | CO3 | 5 |
| c. | Discuss in detail the circuit diagram of an op-amp integrator and derive an expression for the output in terms of the input. | CO3 | 8 |
| **(OR)** | | | | |
| 6. | a. | Explain the circuit diagram and operation of monostable multivibrator. | CO3 | 12 |
| b. | Discuss the operation and wave form of a Schmit trigger using IC 555 timer. | CO3 | 8 |
|  |  |  |  |  |
| 7. | a. | Explain the construction and working principle of magnetron. | CO6 | 10 |
| b. | Discuss the construction and working principle of travelling wave tube. | CO6 | 10 |
| **(OR)** | | | | |
| 8. | a. | With a neat diagram, explain the microwave propagation in cylindrical wave guides. | CO6 | 10 |
| b. | Discuss in detail the crystal detection in microwave. | CO6 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Define Demorgan theorem. | CO4 | 2 |
| b. | Discuss the Karnaugh map representation for two, three and four variables. | CO4 | 8 |
| c. | Explain the block diagram and operation of demultiplexer. | CO5 | 10 |