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

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**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **16NT3011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PHOTOVOLTAICS: ADVANCED MATERIALS AND 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. | Demonstrate the working of Silicon PN junction solar cell. Draw V-I characteristics. | CO1 | 10 |
| b. | Explain the Construction of a simple PN junction solar cell. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Recall about the solar cell parameters with suitable equations. | CO1 | 10 |
| b. | Classify the Family of Photovoltaics cells based on the materials. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Explain the concept of Drift current. | CO2 | 10 |
|  | b. | Derive the carrier transport in semiconductors by solving the drift current equation. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Define Diffusion current and write equation for hole and electron diffusion currents. | CO2 | 10 |
|  | b. | Explain how the energy bands will tilt due to doping gradient with suitable equations. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Enumerate the Physics of Light Emission. | CO2 | 10 |
|  | b. | Demonstrate the charge emission as Simple Harmonic Radiator with relevant equations. | CO2 | 10 |
| (OR) | | | | |
| 6. |  | Illustrate the concept of Exciton, and the Band-to-Band Transitions of electrons. | CO2 | 20 |
|  |  |  |  |  |
| 7. | a. | Appraise the Silicon Solar Cell Technology: in terms of Wafer Preparation. | CO2 | 10 |
|  | b. | Appraise Silicon Solar Cell Technology in terms of Solar Cell Finishing. | CO2 | 10 |
| (OR) | | | | |
| 8. |  | Demonstrate the working of a multijunction solar cell with the thin film materials of Telluride/Selenide/Sulphide. | CO2 | 20 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | Device a Dye sensitized solar cells with suitable materials. | CO2 | 10 |
|  | b. | Propose on Organic solar cells structure and explain the concept of Homo lumo. | CO1 | 10 |

ALL THE BEST