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



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

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| **Code :** | **18EE3002** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PHOTOVOLTAIC SYSTEMS** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Briefly explain the principle of operation of solar radiation and spectrum of sun geometry. | CO5 | 8 |
| b. | With the help of neat diagrams, explain the mismatches happened in the solar cell / module because of series and parallel connection of solar cell / module. | CO4 | 8 |
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| 2. | a. | Estimate the monthly average daily global solar radiation on the horizontal surface at Coimbatore (11.0168° N, 76.9558° E) during the month of June if the average sunshine hours per day is 10.2. Assume values for a=0.27 and b=0.50. | CO5 | 8 |
| b. | With the help of a neat diagram, explain the terrestrial photovoltaic module and derive an expression for the module current (IM) and series resistance (RSEM). | CO4 | 8 |
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| 3. | a. | With the help of a neat sketch, explain the construction and working principle of Copper indium gallium diselenidesolar cells. | CO4 | 8 |
| b. | Design a PV water pumping system, which is required to draw 25000 litres of water every day from a depth of 25mt. | CO6 | 8 |
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| 4. | a. | Give the various configurations of solar PV hybrid system. Write down the merits and demerits of various configurations. | CO4 | 8 |
| b. | Describe the concentrated solar photovoltaic systems. | CO4 | 8 |
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| 5. | a. | With a neat diagram of a Nickel Cadmium battery, describe the working principle, its advantages and disadvantages. | CO4 | 8 |
| b. | Enumerate the factors which are affecting the battery performance. | CO4 | 8 |
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| 6. | a. | Draw the flowcharts for the Perturb and Observe, Incremental conductance MPPT methods used in solar PV system. State its advantages and limitations for each method. | CO4 | 8 |
| b. | Summarize the PV array sizing procedure and battery sizing procedure in a standalone photovoltaic system and draw the graph between CA vs CS. | CO3,CO4 | 8 |
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| 7. | a. | Design the sizing and energy balance of a grid connected Photovoltaic Systems. | CO3,CO5 | 8 |
| b. | Draw the circuit diagram of the three phase inverter circuit. Also draw its necessary waveforms and explain the operation of the circuit. | CO3 | 8 |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8. |  | With the help of a schematic diagram, describe the construction, design and working model of solar powered aircraft. | CO6 | 20 |