

(3 Hours)

[Total Marks: 80]

- N.B. : (1) Question No.1 is compulsory
 (2) Attempt any three from the remaining
 (3) Figures to the right indicate full marks
 (4) Assume suitable data if necessary

1. (a) Explain the working of fuel cell. **20**
 (b) Discuss the wind turbine characteristics.
 (c) Discuss the importance of MPPT in stand-alone PV system.
 (d) Explain biogas power plant.
2. (a) Discuss the working principle of solar concentrators. **10**
 (b) Explain in brief the power converter topology used in Doubly Fed Induction Generator (DFIG) based WES. **10**
3. (a) Explain any one MPPT algorithm with its block diagram. **10**
 (b) What are the different types of fuel cells available? Discuss the features of each with neat figures. **10**
4. (a) Discuss a) Solar PV Micro inverter b) Distributed MPPT. **10**
 (b) What are the different ways to use solar thermal energy? Describe any one of them in brief with the help of a neat diagram. **10**
5. (a) Illustrate the importance of energy storage systems in stand-alone PV systems. Specify C-rating and DoD of batteries. **10**
 (b) Explain geothermal power plant with its advantages and disadvantages. **10**
6. (a) Explain the principles of the following technologies i) Tidal energy ii) wave energy. **10**
 (b) Discuss the power conversion topology of fuel cell conversion system to feed ac loads. **10**