

(3 Hours)

[Total Marks: 80]

- (1) Question No.1 is compulsory
- (2) Attempt any three from the remaining
- (3) Figures to the right indicate full marks

Marks

- Q.1** Solve ANY FOUR questions from following. (Each question carries 5 marks) **(20)**
- a) State and explain the parameters related to batteries 1) C-rating 2) Depth of Discharge.
  - b) What are different ways to use solar thermal energy? Summarize anyone in brief with the help of diagram.
  - c) Discuss the working of micro-hydro power plant.
  - d) Compare advantages and disadvantages of Horizontal axis wind turbine (HAWT).
  - e) Summarize solid oxide fuel cell with the help of diagram.
- Q.2** a) With neat diagram explain the working principle of solar concentrators. **(10)**
- b) Discuss Latent Thermal Energy storage. Demonstrate how solar power can be stored by using Latent heat energy storage. **(10)**
- Q.3** a) Analyze the impact of change in solar radiation and temperature on solar PV Characteristics with a neat figure. **(10)**
- b) Discuss the mismatch in PV module and the phenomenon of hotspots. **(10)**
- Q.4** a) Demonstrate India's reserves of Conventional and Non-Conventional energy resources. Draw the current generation status of different energy alternatives. What is the impact of CO<sub>2</sub> emissions in the environment? **(10)**
- b) Interpret working of Wind energy system (WES) with its various components. What are different power converter topologies used for WES? Explain anyone in detail. **(10)**
- Q.5** a) What are the different types of fuel cells available? Compare the features of each with neat diagrams. **(10)**
- b) Discuss the different topologies used in fuel cell power system. **(10)**
- Q.6** a) Summarize the following technologies: **(10)**  
i) Wave energy ii) Tidal Energy
- b) Interpret the working principle of geothermal energy conversion. Write its advantages and disadvantages **(10)**