

8E4049**8E4049**

B. Tech. VIII Semester (Main/Back) Examination-2014
Mechanical Engineering
8ME1 Renewable Energy Technology

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit - I

1. a) Discuss different renewable sources of energy with special reference to Indian context. (8)
- b) Describe the principle of solar photovoltaic energy conversion and also give their advantages and disadvantages. (8)

OR

1. a) Write short notes on
- materials for Flat plate collector
 - Solar distributed collector power plant
 - Solar chimney power plant.
 - Solar thermal storage. (4×2=8)
- b) Write short notes on followings
- MPPT
 - Limitations of SPV system
 - V-I and P-V characteristics of SPV system
 - Building integrated photo voltaics (BiPV) (4×2=8)

Unit - II

2. a) Explain the working of horizontal axis two blade windmill with suitable diagram. (8)
- b) What methods are used to overcome the fluctuating power generation of a wind mill? Discuss their merits and demerits (8)

OR

2. a) Explain the momentum theory in wind power generation. Give the classification of rotor used for wind power generation. (8)

- b) What do you know about Indian wind power programme? Discuss the site selection for wind power generation. (8)

Unit - III

3. a) Explain the working principle of open cycle OTEC system with suitable diagrams and also state their limitations. (8)
- b) Determine the overall efficiency of an OTEC plant if surface warm water temperature is 27°C and deep cool water temperature is 4.5°C . It can be assumed that the relative efficiency factor of power plant is 55%. (8)

OR

3. a) Explain the various methods of tidal power generation. What are the limitations of each method? (8)
- b) Describe the followings
- i) Tidal wave energy.
 - ii) Progressive wave energy. (4×2=8)

Unit - IV

4. a) Discuss different systems used for generating power using geothermal energy. (8)
- b) Explain the difference between a Geothermal power plant and thermal power plant. What are the different sources of geothermal of energy. (8)

OR

4. a) Draw schematic diagram of an MHD power generating system having heat recovery steam generator. Explain the functioning of the system. (8)
- b) Derive the equation for voltage and power output of MHD generator and also give the maximum power output. (8)

Unit - V

5. a) What is fuel cell? Describe the principle of working of $\text{H}_2\text{-O}_2$ cell also give their limitations. (8)
- b) Write short notes on followings.
- i) Molten Carbonate Fuel Cells (MCFC)
 - ii) Solid Oxides Fuel Cells (SOFC)
 - iii) Methanol fuel cells.
 - iv) Phosphoric acid fuel cells. (4×2=8)

OR

5. a) Discuss the various methods of hydrogen production with neat sketches. (8)
- b) Write short notes on followings.
- i) Economics of Hydrogen fuel.
 - ii) merits and demerits of Hydrogen
 - iii) Zinc air fuel cells (ZAPC)
 - iv) Polymer exchange membrane fuel cells. (PEMFC) (4×2=8)