

**Eighth Semester B.E. Degree Examination, July/August 2022**  
**Renewable Energy Sources**

Time: 3 hrs.

Max. Marks:100

**Note:** Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

1.
  - a. Compare the conventional and non-conventional sources of energy, based on different aspects. (08 Marks)
  - b. Substantiate the statement “Energy consumption is a measure of prosperity”. (04 Marks)
  - c. Calculate the angle made by the beam radiation with the normal to a flat-plate collector tilted by  $30^\circ$  from the horizontal, pointing due south located in New Delhi at 11:00 Hr (IST) on 1<sup>st</sup> June. The latitude and longitude of New Delhi are  $28^\circ 35' N$  and  $77^\circ 12' E$  respectively. The standard IST longitude is  $81^\circ 44' E$ . (08 Marks)
2.
  - a. Explain why solar radiation reaching the surface of the earth is in an attenuated form. (05 Marks)
  - b. With relevant figures, explain the construction and working of a flat plate collector used for heating the water. (10 Marks)
  - c. What is a solar greenhouse? Explain how internal environment of such a greenhouse is regulated. (05 Marks)
3.
  - a. With a neat figure explain the working of a solar pond electric power plant. (10 Marks)
  - b. Write a note on concentrating collector. (06 Marks)
  - c. Mention the major advantages and disadvantages of a solar PV System over conventional power system. (04 Marks)
4.
  - a. Explain the principle of working of a photovoltaic cell (solar cell). (08 Marks)
  - b. With reference to solar PV system distinguish between cell, module, panel and array. (07 Marks)
  - c. Explain the thermal energy storage through the method of sensible heat storage. (05 Marks)

**PART – B**

5.
  - a. Show that maximum power that can be extracted from the wind by a wind turbine is 0.593 times the power in the wind. (10 Marks)
  - b. Discuss the factors that must be considered while selecting the site for WECs. (10 Marks)
6.
  - a. Explain the various stages in biogas production from waste biomass. (06 Marks)
  - b. Mention the advantages and disadvantages of biomass energy. (06 Marks)
  - c. With a neat figure explain the fixed dome type biogas plant. (08 Marks)
7.
  - a. Explain the operation of a double basin tidal power plant. (06 Marks)
  - b. With a schematic diagram explain the working of a closed cycle OTEC system. (10 Marks)
  - c. What are the advantages and limitations of tidal power generation? (04 Marks)
8.
  - a. Explain the working of a fuel-cell and mention the importance advantages. (10 Marks)
  - b. Writing the layout diagram, explain a micro-hydro-electric scheme. (10 Marks)