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## Sixth Semester B.E. Degree Examination, June/July 2024

### Non-Conventional Energy Sources

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

#### Module-1

- 1 a. What are conventional and non-conventional energy sources? Describe briefly with examples. (08 Marks)
- b. What are need for non-conventional energy sources? (04 Marks)
- c. With a neat sketch explain working principle of pyranometer. (08 Marks)

OR

- 2 a. Enumerate the merits and demerits of any four non-conventional energy sources. (16 Marks)
- b. Define Extra-terrestrial radiation and solar constant. (04 Marks)

#### Module-2

- 3 a. Define: i) Zenith angle      ii) Solar altitude angle      iii) Surface azimuth angle  
iv) Declination angle      v) Latitude. (10 Marks)
- b. With a neat sketch explain working principle of flat plate collectors used in water heating system. (10 Marks)

OR

- 4 a. With a neat sketch explain working principle and operational problems of solar pond. (10 Marks)
- b. Write a short notes on latent heat storage and sensible heat storage of solar energy. (10 Marks)

#### Module-3

- 5 With the use of heat transfer correlations explain overall loss coefficient in flat plate collector. (20 Marks)

OR

- 6 a. Define: i) Selective surface      ii) Fluid inlet temperature      iii) Number of covers  
iv) Stagnation temperature. (12 Marks)
- b. With a neat sketch, explain working principle of photovoltaic conversion system. (08 Marks)

#### Module-4

- 7 a. With a neat sketch explain working principle of horizontal axis wind turbine. (10 Marks)
- b. Describe the main considerations in selecting a site for wind generators. (10 Marks)

OR

- 8 a. With a neat sketch, explain working principle of OTEC power plant. List the problem associated with OTEC. (12 Marks)
- b. Write a short notes on harnessing tidal energy and its limitations. (08 Marks)

**Module-5**

- 9 a. What is the scope of geothermal energy? List four geothermal plants in the world. (06 Marks)  
b. What is photosynthesis? Explain different stages of photosynthesis. (10 Marks)  
c. What are the problems associated with bio-gas production? (04 Marks)

**OR**

10

Write a short notes on:

- i) Problems associated with geothermal conversion
- ii) Oxygen fixation in photosynthesis
- iii) Applications of bio-gas
- iv) Properties of hydrogen with respect to its utilization as a renewable form of energy
- v) Anaerobic fermentation. (20 Marks)

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