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# P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Mechanical Engineering

Semester End Examination; Dec. - 2019

Renewable Energy Technology

Time: 3 hrs

Max. Marks: 100

**Note:** i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.

ii) Missing data, if any, may be suitably assumed.

## UNIT - I

- 1 a. Explain India's production and reserves of commercial energy sources. 10
- b. Write a note on:
- i) Solar photo voltaic 10
- ii) Bio-mass and Bio-gas
- 2 a. With a neat diagram, explain the spectral distribution of solar radiation intensity. 10
- b. Define the following:
- i) Solar constant
- ii) Beam radiation 10
- iii) Diffused radiation
- iv) Insulation
- v) Extra-terrestrial radiation

## UNIT - II

- 3 a. With a neat sketch, explain the construction and working of Pyranometer. 10
- b. Define the following terms with suitable sketch:
- i) Latitude
- ii) Zenith angle 10
- iii) Hour angle
- iv) Solar altitude angle
- v) Solar azimuth angle
- 4 a. Explain the working principle of shading ring with a neat sketch. 10
- b. Derive the expression for angle between the incident beam and the normal to a plane surface and the day length. 10

## UNIT - III

- 5 a. With a neat sketch, explain the working principle of paraboloid concentrating collector. 10
- b. With necessary sketches, explain any two applications of solar energy water heating system. 10
- 6 a. With a neat sketch, explain the working of liquid based solar space heating system. 10
- b. Explain the working of vapour-dominated geothermal power plant with a neat diagram. 10

**UNIT - IV**

- 7 a. Explain the vertical axis wind machine with a neat schematic diagram. 10
- b. Mention the advantages and limitations of Tidal power. 6
- c. Define coefficient of performance and Betz limit for wind energy. 4
- 8 a. Sketch and explain the working of double basin tidal system with a neat sketch. 10
- b. Discuss the various problems associated with OTEC. 10

**UNIT - V**

- 9 a. What is bio-mass? Explain the process of anaerobic fermentation and list the advantages. 10
- b. Explain with a neat sketch, the fixed dome type biogas plant. 10
- 10 a. With a neat sketch, explain the electrolyte production of hydrogen. 10
- b. Describe the different methods of hydrogen storage and hydrogen transportation. 10

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