

**R15****Code No: 128EE****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year II Semester Examinations, May - 2019****RENEWABLE ENERGY SOURCES****(Common to ME, AME, MSNT)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART - A****(25 Marks)**

- 1.a) How is solar radiation reaching the earth? [2]
- b) Distinguish between Global Radiation and Diffuse Radiation. Which is applicable during cloudy atmosphere? [3]
- c) Compare focusing collectors with flat plate collectors. [2]
- d) Explain the reasoning for deciding the orientation of a flat plate solar collector. [3]
- e) Explain the formation of winds giving out its potential. [2]
- f) What is anaerobic digestion? [3]
- g) What are the different types of geothermal resources? [2]
- h) Explain the principle of energy extraction from OTEC systems. [3]
- i) Explain thermoelectric phenomenon. [2]
- j) What is the principle of energy conversion in fuel cell? [3]

**PART - B****(50 Marks)**

- 2.a) Highlight the energy potential associated with any three types of renewable energy resources with examples.
- b) Explain the working principle of sunshine recorder with a sketch. [5+5]

**OR**

- 3.a) Explain the need for determining the solar radiation on tilted surfaces.
- b) Explain the methods of measuring solar radiation. [5+5]
- 4.a) Explain with constructional features of solar flat plate collector for efficient conversion.
- b) What is the need for inclination of flat plate collectors, while concentrators are fixed horizontally? [5+5]

**OR**

- 5.a) Compare the performance of solar air heaters with water heating systems.
- b) Describe the working of a concentration gradient solar pond. [5+5]
- 6.a) Discuss the energy potential from wind in the context of India. Where can wind turbines be installed?
- b) Discuss with sketch the working of a fixed dome biogas plant. [5+5]

**OR**

- 7.a) What are the advantages of biomass conversion into biogas? Discuss.
- b) What are the various components of a horizontal axis wind turbine explain? [5+5]

8.a) Discuss the potential of geothermal resource in the world, bringing out the salient points for energy conversion in India.

b) Explain the process of energy conversion from oceans. [5+5]

**OR**

9.a) Explain the process of energy conversion from dry rock geothermal resource.

b) How does the oscillating wave column convert energy into mechanical form? [5+5]

10.a) Describe MHD closed cycle system, with its advantages and disadvantages.

b) Describe briefly the working of a thermoelectric generator. [5+5]

**OR**

11.a) Explain the principles of direct energy conversion with examples.

b) What are the advantages and limitations of fuel cells over other direct energy conversion systems? [5+5]

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