

**R16**

Code No: 138EN

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year II Semester Examinations, July - 2023**

**RENEWABLE ENERGY SOURCES  
(Mechanical Engineering)**

**Time: 3 Hours**

**Max. Marks: 75**

**Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART – A**

**(25 Marks)**

- 1.a) What are the disadvantages of conventional energy sources? [2]
- b) Write a note on 'Indian Energy scenario'. [3]
- c) How is solar radiation classified? [2]
- d) Tell about the basic principle of the Solar Photovoltaic System. [3]
- e) What is the Betz limit? [2]
- f) Name the factors influencing the wind. [3]
- g) What is biomass? Name some biomass sources. [2]
- h) Write a note on Anaerobic Digestion. [3]
- i) Give the working principle of OTEC. [2]
- j) What are the various types of Geothermal Power Plant? [3]

**PART – B**

**(50 Marks)**

- 2.a) Justify the need of renewable energy sources for the future.
- b) Analyze the statement "Conventional Energy sources are by far the largest contributor of global climate change". [5+5]

**OR**

- 3.a) In India, which type of energy sources are used mostly? Why? And tell about the future predictions.
- b) Give a brief note on the "Types of Renewable Energy System". [5+5]

- 4.a) Name the instruments used to measure the solar radiation and explain any one of them.
- b) With a neat outlook, explain the working of a solar thermal energy conversion system. [5+5]

**OR**

- 5.a) Give the principle of the solar energy storage system and tell about it.
- b) List some solar photovoltaic applications and explain any of them in detail. [5+5]

- 6.a) Explain the working of the vertical axis wind turbine with a diagram.
- b) Write a note on "Nature of wind and its classifications". [6+4]

**OR**

- 7.a) What are the advantages of offshore wind energy?
- b) Analyze the potential of wind energy in India and tell about the installations of wind farms in India. [4+6]

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- 8.a) With a layout, explain the working of thermo chemical conversion of biomass.  
b) Explain the production of biodiesel. [5+5]

**OR**

- 9.a) Name the different types of biogas plants and explain any one of them in detail.  
b) What is biogas? What are its properties? What is its calorific value? Outline the working of biogas plant technology. [5+5]

- 10.a) How energy is harnessed from ocean waves? Tell about its merits and demerits.  
b) What is a tidal energy conversion system? How it is producing electricity. [5+5]

**OR**

- 11.a) Write a note on the different turbines used in small hydro plants.  
b) How can Energy be produced from natural hot springs and steam ejection sites? [5+5]

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