

Code No: 156DX**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, August/September - 2024****NON-CONVENTIONAL ENERGY SOURCES****(Common to CE, EEE, ME, ECE, MMT)****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 is the function of sunshine recorder? [2]
- b) Explain the information included in solar constant. [3]
- c) What is orientation and thermal analysis? [2]
- d) Explain (i) Peltier effect and (ii) Thomson effect. [3]
- e) Define latent heat. [2]
- f) Explain briefly about mini-hydel power plants. [3]
- g) What are the potentials of wind energy? [2]
- h) What are the factors affecting the nature of wind? [3]
- i) What are the applications of biogas? [2]
- j) Classify the types of wells in geothermal energy. [3]

PART – B**(50 Marks)**

- 2.a) Explain in detail about solar radiation phenomena.
- b) Define and explain the following terms: i) Zenith angle ii) Solar Azimuth angle iii) Hour angle. [5+5]

OR

- 3.a) Derive expression for beam and diffuse radiation.
- b) What are the reasons for variation in the amount of solar energy reaching earth surface? [5+5]

4. What are the main components of a flat plate solar collector? Explain the function of each component. [10]

OR

- 5.a) What is a fuel cell? Explain the working principle of a fuel cell with respect of H₂ – O₂ cell.
- b) What are the materials for MHD generators? State the requirements for these materials? [5+5]

- 6.a) Classify the methods of solar energy storage. Give brief explanation of each one.
- b) Describe in detail the operation of tidal power plant. [5+5]

OR

- 7.a) Discuss the merits and demerits of solar pond.
- b) Explain various methods of tidal power generation with neat sketches. [5+5]

- 8.a) Derive the expression for power developed due to wind.
b) Discuss about the Betz criteria of wind energy. [5+5]

OR

- 9.a) Discuss the performance characteristics of wind energy.
b) What are the advantages of vertical axis machines over horizontal type? [5+5]

- 10.a) Explain different types of Bio gas digesters.
b) Give a brief note on prospects of geothermal energy in context to India. [5+5]

OR

- 11.a) Discuss about the anerobic and aerobic digestion with neat diagram.
b) What are the main applications of geothermal energy? Explain in brief. [5+5]

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Use of paper Aug-2024