

R18

Code No: 156DX

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, March - 2024

NON-CONVENTIONAL ENERGY SOURCES

(Common to CE, EEE, ME, ECE, CSE, IT, MMT, MIE, CSE(IOT))

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) Define solar constant. [2]
- b) Explain the environmental impact of solar power. [3]
- c) Why orientation is needed in concentrating type collectors? [2]
- d) What is the need for Direct Energy Conversion (DEC)? Explain in brief. [3]
- e) What is solar distillation? [2]
- f) Explain the principle of photovoltaic energy conversion. [3]
- g) State the advantages of wind energy conversion systems. [2]
- h) State Betz Criteria. [3]
- i) What is meant by anaerobic digestion? [2]
- j) What are the advantages of geothermal energy sources? [3]

PART - B

(50 Marks)

- 2.a) Write short note on Beam and diffuse radiation.
- b) Calculate the sunset hour angle and day length at location latitude of 35° N, on February 14. [5+5]

OR

3. What is the difference between a Pyrheliometer and a pyranometer? Explain the principle of Angstrom type Pyrheliometer. [10]

- 4.a) State and explain the advantages of flat plate collectors.
- b) What are the advantages and disadvantages of a fuel cell? [5+5]

OR

- 5.a) Explain the principle of MHD generator.
- b) With the following specifications for an MHD generator, calculate its open circuit voltage and maximum power output: plate area = 0.2 m^2 ;
Distance between plates = 1m;
Flux density = 6 Wb/m^2 ;
Average gas velocity = $2 \times 10^3 \text{ m/s}$;
Gaseous conductivity = 20 mho/m . [6+4]

QA QA QA QA QA QA QA G

QA 6. Explain in detail, the different energy storage methods used in the solar system. [10] OR QA G

- 7.a) What are the advantages and limitations of wave energy conversion?
- b) Explain the closed cycle OTEC system, with its advantages over open cycle system.

[5+5]

- 8.a) What are the main considerations for selecting a site for wind generators? Explain.
- b) What is the basic principle of wind energy conversion? Explain in brief.

[5+5]

QA 9. Discuss the performance of the wind machines with their characteristics. [10] OR QA G

- 10.a) State and explain the problems related to Bio-gas plants.
- b) What are the factors to be considered for selecting a site for Bio-gas plant? Explain.

[5+5]

QA 11. Discuss different methods of harnessing the geothermal energy. [10] OR QA G

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QA QA QA QA QA QA QA G

QA QA QA QA QA QA QA G

QA QA QA QA QA QA QA G

QA QA QA QA QA QA QA G