Code No: 156DX **R18**

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 35^0 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 = 2×10^3m/s;
Gaseous conductivity = 20 mho/m. [6+4]

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

OR

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]

OR

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

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]

OR

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

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