Code No: 158DR **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

NON-CONVENTIONAL SOURCES OF ENERGY

(Common to EEE, CSE, IT, ITE)

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 role of solar energy in renewable energy sources?	[2]
b)	Give the environmental impact of solar power generation.	[3]
c)	What is latent heat and give its importance?	[2]
d)	Define Betz constant and give its range in wind power generation.	[3]
e)	Give the basic principle of bio mass energy conversion.	[2]
f)	List out the economic aspects of bio mass energy.	[3]
g)	Give various methods of harnessing the geothermal energy.	[2]
h)	Define Tidal and Wave energy of power generation.	[3]
i)	What are Thermo-electric generators?	[2]
j)	What is the function of MHD accelerator in direct energy conversion?	[3]

PART – B

(50 Marks)

2.a) Define solar constant. Give the differences between extraterrestrial and terrestrial solar radiations.

b) Discuss about the depletion process of solar radiation as it passes through the atmosphere to reach at the surface of the earth. [5+5]

OR

3.a) Define solar radiation and solar irradiance. How does the irradiance depend on the wavelength of the radiation?

b) Get the empirical equation for estimating the monthly average of daily global radiation on a tilted surface. [5+5]

4.a) Discuss briefly about solar absorption cooling system using a simple block diagram.

b) Briefly explain the working of a forced circulation solar water heater. [5+5]

OR

5.a) Give the salient features of Horizontal axis wind turbines and Vertical axis wind turbines.

b) Write a short note on wind energy potential in India and its growth scenario. [5+5]

6.a) With the help of neat diagram, discuss about any one type of biogas plant.

b) Explain the role of bio-gas in internal combustion engines. [5+5]

OR

7.a) Give the major advantages and disadvantages of bio-mass energy. Explain the process of photosynthesis.

b) What is anaerobic fermentation and give its advantages. [5+5]

8.a) What are hot spots and what is its importance in harnessing Geo-thermal energy?

b) What is the principle in guiding the location of a geothermal power station? [5+5]

OR

9.a) Give different types of geothermal resources? Discuss the prospect of geothermal energy.

b) With a neat sketch, explain the operation of a geothermal power plant. [5+5]

10.a) Derive the expression for emf, free energy, potential, power output and efficiency of a fuel cell and give its applications.

b) Discuss about the thermodynamic aspects of direct energy conversion. [5+5]

OR

11.a) Write a short note on Carnot cycle and its importance in DEC.

b) Draw the performance characteristics of hydrogen-oxygen fuel cell. [5+5]

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