PAPER ID-410149

Subject Code: KOE060A

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
RENEWABLE SOURCE OF ENERGY

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a.	What is the difference between solar cell, solar array and solar panel?	02
b.	How solar cell efficiency depends upon temperature?	02
c.	Define hybrid photovoltaic-thermal (PVT) systems.	02
d.	Define Flat Plate Collector.	02
e.	What is the basic principle of geothermal energy conversion?	02
f.	What are the limitation of Magneto-hydrodynamics (MHD) power plants?	02
g.	Define thermionic conversion?	02
h.	Explain the momentum theory in the context of wind energy.	02
i.	What are the primary sources of ocean thermal energy?	02
j.	What is the main objective of a waste recycling plant?	02

SECTION B

2. Attempt any *three* of the following: 3 x 10 = 30

a.	Discuss the environmental benefits associated with the use of non-conventional energy resources. How do these benefits contribute to mitigating climate change?	10
b.	What is thermal energy storage and why is it important for solar heating and cooling applications?	10
c.	How is geothermal energy converted into electrical energy? Describe the Dry steam, Flash steam, and Binary cycle based geothermal power plants.	10
d.	How do geographic and climatic conditions impact the suitability of a site for wind energy generation?	10
e.	Explain the basic working principle of Ocean Thermal Energy Conversion (OTEC).	10

SECTION C

3. Attempt any *one* part of the following: 1 x 10 = 10

a.	What are non-conventional energy resources and why are they important in the current energy landscape?	10
b.	What materials are commonly used in the production of solar cell? Discuss the advantages and disadvantages of different materials.	10

4. Attempt any *one* part of the following: 1 x 10 = 10

a.	Discuss the advantages and disadvantages of focusing collector compared to flat plate collector.	10
b.	Discuss the main components of a solar thermal power plant and their functions.	10

5. Attempt any *one* part of the following: 1 x 10 = 10

a.	Describe the working principle of proton exchange membrane fuel cell (PEMFC), solid oxide fuel cell (SOFC), and alkaline fuel cells (AFC).	10
b.	Explain the working principle of an MHD power plant. How does it convert thermal energy into electrical energy?	10

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	Discuss the advantages and disadvantages of horizontal-axis wind turbines (HAWT) and vertical-axis wind turbines (VAWT).	10
b.	Explain the concept of wind farms and their integration with the electrical grid. Discuss the current scenario of wind energy generation in India.	10

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7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain the different methods used to convert biomass into usable energy: Gasification Pyrolysis Anaerobic digestion.	10
b.	What are the main challenges faced by waste recycling plants in terms of technology, contamination, and public participation?	10