

**INSTITUTE OF AERONAUTICAL ENGINEERING**

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022

Regulation: R18

NON CONVENTIONAL ENERGY SOURCES

Time: 3 Hours

(AE|CE)

Max Marks: 70

Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

1. (a) Describe the conventional and nonconventional energy sources with suitable examples. [7M]
(b) Distinguish between a pyr heliometer and a pyranometer. Describe the principle of Angstrom type pyr heliometer. [7M]
2. (a) Discuss the necessity to develop non-conventional method of generating electrical energy. [7M]
(b) Determine the value of H_{avg} over a horizontal surface on August 15, at the latitude of $18^{\circ}29'$ if $a = 0.31$, $b = 0.43$ and ratio of average daily hours of bright sunshine to maximum daily hours of bright sunshine = 0.58 [7M]

MODULE – II

3. (a) List the main components of a flat plate solar collector. Explain the function of each. [7M]
(b) Explain with a neat sketch the working principle of standalone and grid connected solar system. [7M]
4. (a) Explain the construction and working of any one type of solar cooker and list out the types of solar cookers. [7M]
(b) Illustrate the construction and working of direct solar dryers. List out the applications of solar air heaters. [7M]

MODULE – III

5. (a) What is wind power? Discuss the basic principle of wind energy conversion. [7M]
(b) List and explain any three types of vertical axis wind turbines with neat diagrams. [7M]
6. (a) What is the difference between bio mass and biogas? Explain the process of commercial production of ethanol from biomass. [7M]
(b) Discuss in detail about anaerobic digestion. Explain different phases and the processes involved in it. [7M]

MODULE – IV

7. (a) Describe the characteristics, advantages and disadvantage of tidal energy conversion system. [7M]
(b) Explain the working of a liquid dominated single flash steam system with the help of a neat diagram. [7M].

8. (a) Explain vapour dominated hydrothermal power plant with neat sketch and its representation on T-S diagram. [7M]
- (b) What is ocean thermal energy conversion? Demonstrate the open cycle system of OTEC system and write the minimum requirement to operate the OTEC system. [7M]

MODULE – V

9. (a) Write a short note on MHD generators. Describe the working principle of MHD generators with neat sketch. [7M]
- (b) Derive the expression for the power and efficiency of thermionic generator. [7M]
10. (a) Describe the working of a Seebeck effect thermo couple. List out the advantages of thermo couple. [7M]
- (b) Explain about electromagnetic waves in energy conversion and list the properties of materials in energy conversion. [7M]

