

# CBCS SCHEME



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18EE653

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022

## Renewable Energy Resources

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Explain causes of energy scarcity. (06 Marks)
- b. Find solar elevation angle ( $\alpha$ ) at 2 hours after local solar noon on 1<sup>st</sup> June 2012. For a city which is located at 26.75°N latitude. (06 Marks)
- c. With reference to the solar radiation geometry define the following :  
Declination angle ( $\delta$ ), latitude angle ( $\phi$ ), Solar altitude angle ( $\alpha$ ), surface azimuth angle ( $\gamma$ ) (08 Marks)

OR

- 2 a. Explain the classification of energy resources. (06 Marks)
- b. Discuss about Indian Renewable energy availability. (06 Marks)
- c. With a neat diagram, explain layers of the sun. (08 Marks)

### Module-2

- 3 a. With a schematic diagram, explain working of a Stirling engine. (06 Marks)
- b. Discuss about different solar cell materials. (06 Marks)
- c. With neat schematic diagrams, explain solar water heating system and solar pond power generation. (08 Marks)

OR

- 4 a. What are the advantages and disadvantages of concentrating collectors over flat plate collectors? (06 Marks)
- b. Discuss about advantage and disadvantages of PV systems. (06 Marks)
- c. With a neat diagram, explain the IV characteristics of a solar cell. (08 Marks)

### Module-3

- 5 a. Brief on recycling of plastics. (06 Marks)
- b. State and explain the methods of hydrogen production technologies. (06 Marks)
- c. Discuss the considerations and guidelines for wind turbine site selection. Also comment on worldwide wind energy scenario. (08 Marks)

OR

- 6 a. Write a short note on recycling of wastes and its benefits. (06 Marks)
- b. Discuss about wind characteristics. (06 Marks)
- c. With a neat diagram, explain binary cycle based geo-thermal power plant. Also list the advantages of geo-thermal power plant. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.



**Module-4**

- 7 a. Explain theory of biomass gasification and stages of anaerobic digestion. (06 Marks)  
b. List advantages and disadvantages of tidal power generation. (06 Marks)  
c. With neat sketches, explain updraft and downdraft gasifiers. (08 Marks)

**OR**

- 8 a. With neat diagram, explain single basin and two basin tidal power plants. (06 Marks)  
b. Brief on biogas plant feeds and their characteristics. (06 Marks)  
c. With a neat diagram, explain floating dome type biogas plant. List the advantages and disadvantages of this type of plant. (08 Marks)

**Module-5**

- 9 a. Discuss the principle and working of sea wave energy. What are the limitations of sea wave energy conversion? (06 Marks)  
b. What are the advantages, disadvantages and benefits of OTEC? (06 Marks)  
c. With a neat diagram, explain oscillating water column device for harnessing sea wave energy. (08 Marks)

**OR**

- 10 a. Explain the principle of OTEC. Explain the basic Rankine cycle and its working. (06 Marks)  
b. What are the advantages and disadvantages of sea wave power? (06 Marks)  
c. Explain the applications of OTEC in addition to produce electricity? (08 Marks)

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